The Journal of the American Medical Association

VOL. XX. CHICAGO, JANUARY 14, 1893. No. 2.

ORIGINAL ARTICLES.

A BIRD'S EYE VIEW OF NEW MEXICO.

Read in the Section of State Medicine at the Forty-third Annual Meeting of the American Medical Association, held at Detroit, Mich., June, 1892.

BY FRANCIS H. ATKINS, MD.,

OF LAS VEGAS, N. M.

MEMBER NEW MEXICO MEDICAL SOCIETY, AMERICAN CLIMATOLOGICAL ASSOCIATION AND AMERICAN MEDICAL ASSOCIATION.

My doubt lest any audience I might have in Detroit might know more of New Mexico than I myself after a dozen years' residence within its borders was measurably lulled last evening when a member exclaimed on learning my home, "Oh! that is just above Peru."

I am sure the gentleman did not pertain to the Section on State Medicine, but the incident emboldens me in displaying this bird's-eye view of the territory I represent, the land of the undying sun, the purple grape and the plaintive burro.

There being no apparent provision for climatology in the several sections, by the courtesy of the officers of the Section on State Medicine, I am permitted to read here a few notes upon the characteristics of New Mexico and their climatic bearing upon the great problems of the prevention of disease.

Since the Hon. Jacob H. Gallinger of New Hampshire, less than two months ago, introduced a joint resolution in the Senate of the United States providing for a commission to select a suitable site for the establishment of a great national sanatorium in one of the territories for the treatment of pulmonary diseases, and especially as the bulk of his corroborating testimony relates to New Mexico, I feel that a paper bearing on that territory, its merits and demerits, may fairly be ranged under the title of State Medicine.

New Mexico, oldest named of American regions marked by the infrequency of phthisis, has, by reason of its inaccessibility and of its slow social development, been greatly neglected as a field of resort for phthisical and other invalids. Whatever claim Colorado has to your patronage, New Mexico has in equal force, with the added advantage of a lower latitude and hence warmer winters. This has not been justly appreciated, and the superior social features of the Centennial State have given it a position in eastern thought above our Sunshine State not justly merited when the question is one of saving the life of the tuberculous and not of furnishing them luxuries.

So vast is New Mexico that England, Scotland, Wales and Ireland could be placed within its borders, I am told by our nimble arithmetician, while in altitude it varies from 3,800 feet, on the plains of its south and east borders, to lofty mountain ranges over 12,000 feet high. Necessarily, here is variety to suit a multitude of varying cases. So much misconception exists concerning this wide combination of mountain and plateau that I hasten to briefly mention the leading features of its climate.

The mean annual temperature of Santa Fé at 7,000 feet altitude is 48° and that of Las Vegas at 6,450 feet 51°—the latter corresponding with Peoria and Indianapolis.

That of the plains is considerably higher, being 55° to 60° toward the south.

As to moisture—the dryness of New Mexico is notorious. The annual precipitation in 30 odd years at Fort Union not far from Las Vegas—in the northern part—averaged 18 inches, but at Santa Fé only 15 and at El Paso, just below our southern border, but 12 inches. When it is remembered that one half of this falls in midsummer and but six to eight per cent in winter—and this wholly as snow—it will be seen that invalids here escape the dreaded combination of wet and cold.[1]

The figures for percentage of moisture are low, the annual mean for many years at Santa Fé being but 45, the monthly mean not passing above 54 in winter and often falling to 30 (and even 20 at Las Vegas) in spring and early summer.

Our governor when asked to give New Mexico a name of sentiment dubbed it the Sunshine State. The sky seems infinitely high above our heads there as contrasted with that of Detroit or New York, and we bask in the sun's rays to a degree hardly known elsewhere. A Signal Bureau analysis placed El Paso, Tex., and Fort Stanton, New Mexico, in a short preferred list for least average cloudiness, with but 29 and 25 days respectively per annum reported cloudy. In one recent year I noticed Santa Fé accredited with 27 cloudy days, while Detroit had 123 and Chicago 116, while the proportion of days rated clear in New Mexico to days called fair is immensely greater than in the lake cities.

New Mexico is often spoken of as a windy state and visitors carp at us because we do not report our winds. Let me say that the much visited Colorado quite equals us in the annual mileage of wind. Government observers at Santa Fé and Fort Stanton report an annual movement of about 60,000 miles. That of Colorado Springs has been observed as high as 90,000 miles in a year, and especially do this highly favored resort and Denver report winds exceeding in maximum velocity those in New Mexico, a signal advantage to the latter region.

In average velocity Santa Fé wind ranks with the soothing Jacksonville, Fla., as well as in total mileage. while as a matter of fact the whole east slope of the Rocky Mountains is wind swept to about a similar extent—as to annual mileage—the wind movement of New Mexico is actually less than that

[1] The average total precipitation in three winter months at Fort Union for 10 years was 1.09 inches of water, all as snow.

of Detroit and St Paul by one sixth, less than that of Boston and New York by one fourth. It is the dust incident to the dryness (as in the other southwestern states) that has given New Mexico a bad name by accentuating its winds. But this is chiefly annoying in the streets of our towns and here is being combatted by sprinkling as is done in the towns of California and Colorado.

A mean annual temperature of 48 to 51 degrees should sufficiently assure eastern physicians and their patients that the winters in the higher altitudes, as at Santa Fé and Las Vegas, cannot pass without occasional zero temperatures, on one or two days only in some winters, in others for two or three weeks, in January the air being as still, clear and crisp as that of Minnesota (but dryer), and the public health rising to a maximum. I dwell on these facts because still invalids stream into New Mexico expecting, by the delusive suggestions of its last name, to find a tropical climate with the fruits and flowers of the same. Even in the southern sections, at lowest altitudes, it is far from tropical.

We offer simply a very dry air, a vast amount of sunshine, a breeze that never is warped into cyclonic effects, altitudes from 3,800 to 7,000 feet with towns providing constantly improving shelter and comforts for invalid visitors, or even 9,000 feet, with occasional dwellings, for more tolerant cases. Necessarily the air is pure, for except to a small extent in the Rio Grande valley, there is no malaria, and water is too scarce to waste it in making swamps.

Visiting doctors wonder how the New Mexican doctors live, so meagre is the practice afforded, so healthful the climate. The Las Vegas doctor often has long spells of enforced idleness when he cultivates philanthropy and the softer virtues. During the past year many months saw our physicians but lightly employed, while our well equipped druggists were subsisting by selling perfumery and cigars. We have no regular seasonal diseases, as abdominal diseases in summer, malarial in autumn or pulmonary in winter—the light pharyngitis and bronchitis of the country is naturally more prevalent in December and January. Pleurisy is extremely rare; croupous pneumonia not at all common, catarrhal pneumonia but little more so. Acute articular rheumatism is uncommon. The renal degenerations are practically unknown. In nineteen years on the plains and mountain borders, I have not seen one genuine case of Bright's disease, and but a single case where an acute nephritis perhaps of zymotic origin—lingered and was fatal. If kidney degenerations can be foreseen or if they tend to prevail in certain families, certainly New Mexico is the place for resort and residence in such instances.

Indeed, the only really prevalent disorder is the lithæmia or concealed gouty diathesis, of which there is a curious abundance—at least in higher altitudes—but proper hygiene prevents or cures this.

The three inroads of influenza, though visiting us, made no deeper impression than our simplest winter visitation of sore throat. In the first no consumptives in Las Vegas were touched by it; in the second a few visiting invalids felt its force but recovered without apparent detriment. In fact no American death in any way attributable to the influenza has occurred in my part of New Mexico.

The climate of New Mexico is especially adapted to the restoration of phthisical cases in the earlier stages—for instance, Mrs. A. of Chicago, age 23 years, continuously coughing for six months, sputa examined by a well known specialist and contained bacilli, history of increasing weakness. Ten weeks after reaching Las Vegas, New Mexico, all cough had ceased, no pus was expectorated, and she could run up long flights of stairs rapidly. Mrs. B. came to same place 14 years ago for cough, hæmorrhages and emaciation. Within three years all symptoms disappeared, she married, bore healthy children, and has lived with impunity the past three years in New England, a robust woman. These are sample cases, hardly scientifically reported, of which our territory can furnish many.

Cases with cavity, if not progressing too rapidly, on arrival will mend, but in the name of all honest Rocky Mountain doctors and tender hearted lodging house keepers let me beg that cases with advanced destruction of the lungs, high temperature and persistently rapid pulse be not sent to this country—or, at least, not to the higher localities.

On the other extreme there is no better climate in which persons who are merely weak, or who are lacking robust development, especially such as are of tuberculous stock, or in markedly delicate families may secure safety from phthisis or develop more robust bodies. Such families escape in New Mexico the sickness and premature death so likely to seize them in the damper states.

Scrutiny of the annual reports of a vast benevolent order reveals a remarkably lower death rate and sick list for this territory than for a string of central and eastern states, while the time lost per member by sickness was singularly less than in those states—attesting the great salubrity of the climate.

The death rate of the resident American population, which I have studied a number of years, is low, ranging in Las Vegas from 12 to 6 per thousand per annum. As illuminating the unpleasant side of sending moribund consumptives to New Mexico, our gross death rate was increased from 22 to 56 per cent each year (in a series of years) by the deaths of these forlorn visitors. Moderate cardiac valvular disease need not bar a visitor, while occasionally extreme valvular obstruction may exist for years without detriment to health and comfort.

The visiting consumptives show a very minimum of the ordinary incidents of phthisis. Hæmoptysis is rare; I have prescribed for night sweats but twice in seven years; cough and expectoration generally diminish.

As to advancement in medical legislation, New Mexico has a Medical Examining Board under an old and clumsy statute. Efforts of our medical society to secure its remodelling on the best in other states have been baffled by politicians in our own profession. Similar fate befell bills concerning expert testimony and privileged witnesses among medical men. Formerly small-pox corpses were carried through the streets on boards by daylight for public burial, and not a few such were laid by the native faithful under the floors of the Catholic churches. Modern legislation has abolished all this. An excellent school law, now one year in successful operation, has quite taken the fancy of the natives and bids fair to be the first entering wedge for sanitary ideas. A recent curious statute forbids graveyards to lie nearer than 50 feet to any river; the former limit was 25 feet!

There is no territorial board of health, but local health officers do efficient service in a few towns. Hospitals exist in several towns. Our medical society constantly agitates sanitary subjects. The fatalism of the Mexicans and their utter lack of appreciation of the sanctity of human life (when disease is in question) are the chief hindrances to sanitary reform. In a few weeks it will be my privilege to lecture before a summer normal school, chiefly of native teachers, on the prevention of disease. But from the start I shall be handicapped, for my prospective hearers do not dread or attempt to prevent the contagious diseases, and, when God wills it, all their little brothers may die and they will not complain.

Finally, we denizens of New Mexico marvel that eastern people do not make our higher altitudes a summer resort. All who have lived here unite in pronouncing the summers the nearest to ideally perfect that they have ever seen. The young people complain that the evenings are too cool to let them sit freely on the piazzas; the nights are always cool; the heat of the day—rarely touching 90°—is so tempered by the dryness as not to be oppressive; sunstrokes, like the cyclone, malaria. the flea, the mosquito, are unknown. High temperatures with high percentage of humidity are very rarely seen, and then but for an hour in the morning.

ARRESTS OF DEVELOPMENT AND DECALCIFICATION OF THE ENAMEL AND DENTINE.

Read in the Section of Oral and Dental Surgery, at the Forty-third Annual Meeting of the American Medical Association, held at Detroit, Mich., June, 1892.

BY EUGENE S. TALBOT, M.D.,

OF CHICAGO.

I wish to call your attention to a few observations which I have made in regard to a want of calcification and decalcification of the enamel and dentine. The conclusions arrived at are the result of the study of three cases which have presented themselves to me for treatment.

The first case is that of Miss C., 24 years of age. Her jaws have gradually come closer together, owing to a wearing away of the teeth. The front teeth have exceeded the back ones so that considerable space was noticed between her front teeth. The articulation was so poor that she was unable to chew her food and mastication was imperfectly performed with the vault of her mouth and tongue. Owing to the constant use of her tongue for purpose of mastication, hypertrophy had taken place to such an extent that her speech had become impaired. She was a constant sufferer from indigestion due to improper mastication, which was readily detected by the thick white coating on her tongue. Upon examination of her teeth, I found them of a dark yellowish color, containing grooves and pits, indicating arrest of development due to some of the eruptive fevers early in life. The bicuspids were the only teeth that had any semblance of normal contour, although the second molars were fairly well developed. None however, were smooth like ordinary teeth. The roots of the second molars upon the right side of the jaw still remained, while the first molars had been extracted. The anterior teeth, both upper and lower, were worn away from one-third to one-half the length of their crowns. I judge that this was not due to friction by mechanical attrition for two reasons: first, the present teeth were very rough upon their cutting surfaces. If it had been due to attrition they would have been smooth; 2. the roots of the second molars were smooth and polished. They did not occlude with the upper molars. Hence, abrasion by attrition is wholly out of the question. In order to improve the appearance of the face and make the teeth serviceable for mastication, it was necessary to crown all the teeth except the six lower anterior ones. Upon scratching and shaving the crowns and roots, the enamel and dentine could be shaved off like horn or old cheese. The inclination of the crowns and roots of the upper anterior teeth when the jaws were in their proper position was such that the anterior and labial surface had to be shaved and ground down to such an extent that the pulp chamber was ground nearly to the cervical margin, without exposing the pulp, thus showing that the pulps had receded entirely from the crowns. This was also the case with the molars; no canals could be found in the roots. A sister of the patient had also similar teeth; she died at the age of five, of membranous croup. Her mother said that she had tried to have her children eat oatmeal for the purpose of improving the tooth structure, thus showing that she was not unmindful of the bad condition of the children's teeth. The father's teeth were in a similar condition although not quite so bad. The grandfather and grandmother on her father's side were both of a nervous temperament. Tartar accumulated early upon the teeth of all. The teeth of these girls erupted at an earlier age than usual.

Case 2, is that of a girl, aged 11 years, who was sent to me by her physician for an opinion as to the cause of her trouble and also for the purpose of treating her mouth and teeth. I found her an exceedingly nervous child, she would cry upon the slightest provocation. Her bones were small in diameter and she was rather short for her age. Upon examining her mouth I found the teeth covered with tartar of a bright yellow color. The tartar formed a continuous band extending from the second molar of one side to the second molar of the opposite side—this was upon both jaws. To such an extent had this accumulation taken place that it was impossible to locate the individual teeth until the tartar was removed. This was very difficult to accomplish because the slightest grating of the instrument upon the teeth would produce such a sensation upon her nervous system that she would nearly go into spasms. I could operate only about five minutes at a time. Upon the removal of the tartar, I found that the crowns, including the enamel and dentine were as soft and cut like horn. The tartar accumulates upon her teeth to such an extent that in two week's time, they will be completely covered. The child has occasionally nervous spells at which times all her teeth will ache. She suffered the most excruciating pain for about ten minutes after the impressions were taken for the models which are here presented. No cavities were found in her teeth. The child takes plenty of nourishment but the phosphates and carbonates are not assimilated, which is also indicated by the small bones and nervous condition. Believing from the large amount of tartar which is excreted by the salivary glands that an excessive amount must also be excreted by the kidneys, I submitted a quantity of urine to Prof. Walter Haines of Rush Medical College for an examination. The following is his report: "From 100 cc. I obtain 0.0775 grams of the calcium phosphate ($Ca_3\ 2\ Po_4$), from which I calculate that the entire amount of calcium phosphate eliminated by the urine in 24 hours is 0.9168 grams. All the calcium in the urine existed as phosphate and none as carbonate. Gautier gives the average amount of calcium phosphate in the urine of an adult for 24 hours as 0.40 grams."

When we take into consideration, the age of this patient, and the fact that children are not in the habit of excreting the phosphates as grown people are, it will be found that this child is excreting through the kidneys four times as much as normal individuals at 30 years of age. None of the carbonates were present which shows that a large drainage was taking place from the system.

Case 3, is that of a gentleman, a lawyer, 42 years of age. He complained of sensitiveness of his teeth whenever food was taken into his mouth, he suffered no pain at other times. I found that all the teeth were arrested in their development, with pits and groves running across the anterior teeth and clear around the bicuspids and first molars, and above and below these grooves, constrictions and irregularities of structure occurred, extending to and including the grinding surfaces. These conditions were the result of arrest of development due to the exanthemata—he informed me that he had had all the children's diseases. In all these teeth the enamel was imperfect and the cavities had been constantly excavated and filled. Upon examining these sensitive places in the molars, which were deep, I found that the

structure cut like horn or old cheese-rind, and extended into the dentine an eighth of an inch below the soft decay. The color was dark brown. We frequently find these spots of a darker hue in the molars, but still soft when cut with the excavator. No enamel or rather hard organized enamel is present. Believing from the depth of the cavity and the character of the pain that the pulp was exposed, I cut into floor of the cavity with an excavator and finally with the bur until I was afraid of going through into the alveolar process without finding the canals. The tooth was afterwards filled with cement and has remained quiet for four months. The secretion of the mouth is alkaline.

Case 4, is one which comes under the care of Dr. W. C. Barrett of Buffalo, N. Y., and was presented before the Illinois State Dental Society in 1882. The following letter accompanied the models. "The casts were made from impressions of the dentition of a young man, a resident of this city, of otherwise full development, in excellent general health, with no marks of inherited disease, and who comes of a sturdy race, the family occupying high social and business positions. Nearly two years elapsed between the periods of taking the lower and upper impressions, which accounts for an inexact occlusion.

When I first saw him, the possessor of this denture was about 18 years of age. The maxillæ, as might be seen in the casts, were well developed, and there was nothing approaching deformity, as the mouth presented a full and natural appearance although of course no teeth were visible. I counseled him to refrain from any meddling, as his condition could not, in my opinion, be bettered by the dentist. At that age young men are very solicitous about their appearance, and, annoyed I suppose at his peculiarity he applied to another practitioner who gave a different opinion, removed all the upper roots, and inserted a rubber denture which the young man is now wearing. I subsequently extracted some of the father's teeth and have made a microscopical examination of them.

It will be seen that there are absolutely no crowns to the teeth, their summits being for the most part upon a level with the gum and this was also the case with the deciduous dentition. The only vestige of enamel was some minute nodules or kind of beadwork around the cervical edges of two or three of the molars. The gum had a dense, glistening appearance, hard, unyielding, with apparently less than normal vascularity, and seemed admirably adapted to assist in mastication, reminding one of the maxillary appearance presented by the gramnivora that have incisors upon only one jaw. Of course there was nothing like a pulp chamber, but the roots of the teeth have nerve canals, which, however, are obliterated at the cervix. The exposed dentine, before extraction of the teeth, seemed very dense and hard, and when tried with an excavator was about as sensitive as ordinary enamel. The color of the exposed ends of the teeth was of a rich, dark amber hue, approaching mahogany, and they were smooth and polished by attrition.

This peculiarity is not the result of disease, nor is there anything simulating the appearance of the atrophied crown which is sometimes the mark of arrested development, due to some functional derangement; it seems the result of hereditary transmission. The father had precisely the same dentition, though the son is the only one among several children, who has inherited this peculiarity. The father was also the only one in a large family who possessed this dentition. Beyond this I have no certain data, but I am informed that the mark has been persistent in the family as far back as they have any knowledge, although it has seldom appeared in more than one member at a time, some generations escaping entirely, while it cropped out occasionally in a collateral branch without being transmitted to descendants at all. In the direct line of descent it has, as well as I can determine, usually appeared in at least one member of the family, and that without material modifications. The young man of whose jaws these casts are fac similes, may then reasonably be expected to transmit his denture to one out of a number of possible children, while the others will escape. His brothers and sisters may perhaps have children among whom will be found this lack of development, but the peculiarity will probably end there in their cases, while it is indefinitely continued in the direct line of descent.

When the father first presented himself to me, he had but two or three of these incomplete teeth left. These were worn down to mere points, and he had for years done his mastication upon the unprotected gum. The alveolus was so much absorbed that artificial substitutes had become a necessity and under my directions he was supplied with an entire new set. The roots, or the remainder of them which I removed, were of a dark mahogany color, due to staining of the dentine, and the nerve canal was entirely obliterated. They had once doubtless been of nearly the normal size, as are those of the son, but had been worn down to the point by mastication, having been gradually raised in their sockets to meet the demands of nature.

I made microscopical sections of some of the son's teeth and mounted them for examination. At the cervix of the teeth—the surface presented for mastication—very few marks of the dentinal tubules remained, they seeming to have been obliterated by an infiltration or deposition of calcareous dentinal matter. As I neared the apex of the roots the sections presented a more perfect dentinal arrangement, and the tubules more of the usual appearance though the whole structure of the tooth was loose and showed numbers of minute chambers, some of them apparently communicating by what appeared to be abnormally large dentinal tubules. The nerve canal, entirely obliterated upon the grinding surface, (though from the direction and arrangement of the few tubules visible it had once existed) farther towards the apex of the root made its appearance and was of nearly normal size. The ends of the roots were well formed, and the apical foramen had the appearance of fully developed and well grown teeth. The cementum was much less in proportion than is usual, the dentine at most being invested with but a very thin layer, but what there was, presented no unusual appearance. The enamel which was found in minute nodules at the cervix of two of the teeth, was extraordinary in appearance. It did not present the usual relation to the dentine, and at the junction of the two there was not the frequent reaching over of some of the tubules. The enamel rods had not the usual regular appearance, but the substance of the enamel seemed twisted and contorted. It existed in minute aggregations, and seemed to have little of the usual relations with dentine. The most of the teeth had no enamel whatever. I can do little by way of accounting for this abnormal dentition. The entire absence of enamel in most of the teeth must have been due to a lack of enamel organ, or to its functional inactivity. The teeth erupted about the usual period, though perhaps a little later than usual. They have never shown any signs of caries, those of the father wearing out without decay, and those of the son being perfectly sound and quite exempt from disease. The case has been one of interest to me, and I should be glad to know if any other dentist has met with a like peculiarity."

V. 18

Such conditions are frequently observed in connection with one or two or even three and four teeth. I can recall a number of cases where the lower central and the lateral incisors of both sets are in the same condition, while all the other teeth are normal. I can also recall a case where the bicuspids upon both sides are in the same condition and the other teeth are normal; and also other cases where the first molars upon both sides are in the same condition and also the roots of the second lower right molar, although I am not quite certain of this; the other teeth are normal. I have frequently seen and you have all observed the first permanent molars in that soft condition, contracted at different points, presenting holes and grooves which run in all directions. The decay extends deeply and is of a dark brown color resembling spunk or the decay of the heart of a tree; the tooth is exceedingly sensitive to touch and painful when food of different qualities come in contact with it. The secretions of the mouth are usually perverted, and when these teeth are excavated, the softness of the enamel and dentine is readily noticed. The pulp recedes frequently, obliterating the pulp chamber.

The roots of the case illustrated by Dr. Barrett, seem to be covered at the cervical margin with dentine which would also indicate that the pulp had also receded. I have observed this in the roots of molars, bicuspids and incisors when in a similar condition.

When this condition takes place in old people the enamel and dentine become exceedingly hard, and no sensation is experienced when the tooth is excavated. You will therefore observe that while the recession of the pulp is precisely the same in both cases the results are directly opposite. We have all observed teeth of a dark color, and so worn down that occlusion is impossible, while the teeth anterior and posterior to them, are in a healthy condition—this is frequently the case with the first permanent molar.

Their surfaces are smooth and polished. The color of the crowns of these teeth are not unlike that of the roots and teeth already illustrated in the cases presented.

I should class under the head of abrasion and erosion cases where one, two or even all the teeth are affected and where the color of the enamel and dentine is normal. Many theories have been advanced of the etiology of abrasion and erosion but I think that all these cases can to a certain extent be classed under the same condition, namely, primarily a want of calcification and a decalcification of the enamel and dentine. We frequently find that the first permanent molar and sometimes the second and third are worn away, and all the other teeth are normal. These mouths sometimes present strange conditions. First, decay is rarely present. Dr. Barrett very aptly says in his case, "That the teeth showed no signs of decay, those of the father wearing out without decay. The secretion of the mouth is most always alkaline and quantities of tartar are usually present. In ordinary mouths when the secretions are acid decay would take place because of the recession of the pulps—usually tartar in large quantities is present. These conditions render decay almost impossible. These teeth are always soft, cut readily under the bur and the pulps recede so that in many cases the pulp chamber is entirely filled. The anterior teeth upon the upper and lower jaw will wear away frequently, leaving a space of from one-fourth to three-fourths of an inch between them, while the teeth posterior to them occlude. The enamel although nearly twice as dense as the dentine wears away as readily as the dentine. What conclusion can we draw from these facts? We have already shown that in some cases the phosphates and carbonates are not assimilated. This to my mind is the cause of erosion and abrasion. We instinctively make the remark to a patient that it is better for teeth to erupt late because the tooth structure will be of a better quality. I have frequently observed this in irregularities of the teeth—when these teeth are slow in coming through, they are larger, more dense in structure and set more deeply in the jaw. The reverse is the case when they erupt early. The structure of the tooth is not well nourished. This condition can also occur in utero, the mother not giving sufficient nourishment to her child. Dr. Marshall in his paper entitled "The Oral Cavity of Pregnant Women" read at Newport, 1889, alludes to "certain cases of pregnancy in which the nutrition was impaired and as a result the bones and dentine became abnormally soft and that thus this softening of the dentine predisposes the teeth to decay." The child after birth may be poorly nourished and thus the bone, teeth as well as other tissues of the body suffer as a result. You are all familiar with the fact that the teeth suffer from a want of nourishment, and arrest of development will take place when the child is afflicted with the constitutional diseases. These teeth are soft and when the enamel is lost decay attacks them. After the teeth are formed they frequently decalcify. This is well illustrated in the case of pregnant women—the teeth seem to lose their vitality and decay early. If the teeth disintegrate under these conditions why will they not in constitutional diseases, as consumption, typhoid fever, etc? We know that this is the case so far as decay is concerned. I have called your attention to the fact that in some cases especially in children between 12 and 20 the phosphates and carbonates do not assimilate and hence there is a softening of the teeth and bones. We find that these substances which are taken in the system in the form of food for the nourishment of the body are deposited, unorganized upon the teeth, being excreted by the salivary glands. These substances are also excreted by the kidneys. The brain is not properly nourished, and as a result the child becomes very nervous, or again the child may possess a very active brain and the phosphates are entirely used up in its nourishment, the bones and teeth suffering in consequence. I have plenty of material that could be brought forward to sustain this theory, but the paper is now so long that I will not weary you with any further data. I have tried to find some mode of treatment but at the present time have been unable to lay down any fixed rule. Plenty of outdoor exercise and good nutritious food are about all the measures that can be suggested. It is possible that if the child lives long enough he may outgrow this want of assimilation.

Discussion.

Dr. W. C. Barret: We should try to determine the reason of the want of enamel in these cases. In one case there was a total lack of crowns to the teeth, and no enamel at all, except some little nodules at the gingival portion. In my report, quoted by Dr. Talbot, I stated that the dentinal tubules were not entirely normal. I believe this was because there were no crowns to protect them, and being normal at first, the modifications were caused by the want of the pro-

tection of the enamel. The roots were perfect, and mastication was performed upon the tops of the roots. Of course there was a cause for this absence of enamel. Could it be an entire failure of the enamel-membrane derived from the epiblast while the mesoblast performed its office correctly? The deciduous teeth of these patients had some kind of crowns. I do not know and could not learn just how near to normal they were.

We should take up and make a study of the pits and cracks often found in enamel. No one has as yet demonstrated the reason for them. They have been ascribed to the diseases of childhood, but if that is true why do they not occur all over the enamel? The enamel is all formed at one time, and these pits and marks should be in all parts of it. We all know that this is not generally the case, and we cannot prove that they are connected with the eruptive diseases of childhood. If every child who had eruptive diseases had these defects in its teeth, then it might prove that they were the cause, but it is not so.

Dr. Gish reported a case of a child, seven years old, whose temporary teeth were in a condition very much resembling the teeth described by Drs. Talbot and Barrett, only that they had had crowns. When he first saw the case, every one of the deciduous teeth was worn off even with the gums, and the roots were of a polished mahogany-brown appearance. He watched the case with a great deal of interest. He had to remove the roots of the premolars, as they were so firm that the permanent teeth did not erupt. When the permanent teeth did come in, they were quite perfect. What factor could cause such a condition in the deciduous teeth which still would not affect the permanent set?

Dr. Fletcher asked Dr. Barrett how many generations of the family—the subject of his report—he had positive knowledge of.

Dr. Barrett said he had positive knowledge only of the father and son. As for the preceding generations, he knew nothing only that it was an accepted tradition in the family that there had for a long time been one or more with short teeth in each generation.

Dr. Allport spoke of three girls in one family, who were patients of his, whose teeth were quite short and of a light slate color; in two of the girls the back teeth only were affected, in the third even the front teeth were of the same color. He learned that the grandfather had teeth of the same character, though the boys in the same family had perfectly natural and well-formed teeth. The peculiarity was evidently hereditary.

Dr. Talbot said, in closing the discussion, he wished to call the attention of the section to the prevalency of cases of a want of assimilation of the phosphates and carbonates in the food, and the consequent lack of these elements in the teeth, bone, and brain. We will find a child, say of twelve or fourteen years,—likely a girl,—very nervous; eats everything, beefsteak, milk, etc., yet is so nervous that she cannot control herself,—perhaps cannot hold her urine. She will be a bright child, with small bones. Upon examination her teeth will be found full of tartar, and her urine loaded with carbonates and phosphates. This material, so badly needed to supply the bones, teeth, and nervous system, is not assimilated, but is excreted by the salivary glands and in the urine.

Similar conditions are found in pregnancy; the teeth decay more rapidly than they would otherwise, and if a limb is broken the bones cannot be gotten to unite. These cases show that the phosphates and carbonates are appropriated by the fœtus. We know, too, that in many diseases the teeth do not receive sufficient nourishment. The teeth show erosions arising from the constitutional condition which produces softening, and the attrition of the food and the adjacent parts wears the teeth away. Dr. Truman says that in erosion the structure of the teeth is harder than usual, but I think it is softer.

We all have these patients, but none of us know how to treat them successfully. We are advised to take the child from school, keep her out of doors, on a farm, with horseback or bicycle riding. We will try all these and many other measures, but with little prospects of success. The probability is that such a child will die of consumption within a few years.

Another condition of the system which affects the teeth is gout. A gouty patient will almost invariably, if not quite show a softening and erosion of the teeth.

Dr. Fletcher said he had a case, a patient about 45 or 50 years old, whose incisors were entirely denuded of enamel on the labial side. The appearance was not as if it had dissolved away, but rather as if it had split off, as the edges were distinct.

Dr. Clifford asked if there was any peculiar diathesis in this case.

Dr. Fletcher said he did not know of any.

Dr. Barrett reported a case somewhat similar, with the enamel all gone from the labial surface, leaving it smooth. The teeth came to a sharp edge and crumbled away. He did not know what to do with them, unless he put crowns on them. The enamel on the lingual surface was intact. They were just the reverse of the teeth of rodentia.

On motion, the subject was passed, and Dr. J. L. Gish read a paper on "The Diseases of the Gums."

Dr. Gish's paper included a classification of the various pathological disturbances of nutrition as they are expressed in the soft tissues of the mouth. He described clearly and fully the several types of inflammation, from simple acute to chronic suppurative inflammation, as well as the cellular changes expressed as morbid growths. The pathological processes, as well as the clinical appearances in their different phases, were fully set forth, and the paper was a fair *résumé* of present knowledge in this department of pathology.

Its great length, and our lack of available space, coupled with the fact that we have recently presented our readers with similar matter somewhat *in extenso*, precludes a fuller abstract.

Dr. Fletcher related an experiment which he had made to show the influence of the faradic current in the circulation. He isolated the mesentery of a frog, and under the microscope watched the circulation until stasis had set in in a few of the vessels; then, by turning on the faradic current, he cleared up the whole zone. The shock stirred up the white blood-corpuscles and started up the circulation. He had found the use of the current in diseases of the gums very satisfactory, as described in the paper.

Dr. Curtis said the essayist had ably described the pathological conditions of diseased gums, and he regretted that the treatment had not been described more fully. He believed electricity was a great remedy for these diseases, and as we get to understand the use of it better, we will be better able to treat them.

Dr. Marshall, said, in regard to the use of the electrical current, if the positive pole is placed over a location where hyperæmia exists, and the negative pole over the base of the brain, the hyperæmia will be decreased. If the poles are reversed, the hyperæmia will be increased. His treatment had been mostly in cases of hyperæmia of the pulp. When the tooth does not positively pain the patient, but feels as if toothache were imminent, by applying the current and repeating for a day or two the condition will be passed, and the necessity for further treatment averted.

THE GENERAL AND THE LOCAL IN DENTAL PATHOLOGY.

Read in the Section of Oral and Dental Surgery, at the Forty-third Annual Meeting of the American Medical Association, held at Detroit, Mich., June, 1892.

BY J. SMITH DODGE, Jr., M.D., D.D.S.
OF NEW YORK, N. Y.

The whole field of pathology is divisible into the general and the local; and the opinions of pathologists have fluctuated many times in assigning the controlling power to the one or the other.

Ignorant minds necessarily look at the seat of pain or other disturbance as containing the disease. It was considered a great scientific advance when disease was pronounced an affection of "the humors," meaning all the liquids of the body, and therefore conceived as general with local manifestations. In our time the cellular pathology of Virchow has given a strong impulse again toward the more local conception, and bacteriology seemed for awhile about to convert all pathology into the local action of microbes. But the opinion grows that it is not so much the bacteria as their ptomaines, diffused by the hæmatic and lymphatic circulations, which cause disease; and this may bring us back again to the humoral theories, with the great advantage that we have discovered the *materies morbi*.

Dental pathology is so recent that it can hardly be said to have shared all these fluctuations; but it has room enough for them all, and its short history shows now the general and now the local view predominant.

The earliest modern dentists were first of all physicians, several of them among the great lights of medicine, and they naturally viewed all affections of the teeth not of mechanical origin, as symptomatic of general disorder. But when dental operations had been invented the processes were so obviously local both in causes and in results, that they fell speedily into the hands of men who were merely skilled mechanics, and the general relations of the art were almost neglected or treated in the most empirical manner.

A great change resulted from the labors of Dr. Harris and the founding of the Baltimore College of Dentistry, which was the birth of dental education. For many years the constant effort of educated dentists was to remove the stigma of a mechanical art and to assert their affiliation with medical men. This effort naturally brought forward again whatever could be alleged as connecting the teeth with the general system, whether as exerting or suffering pathological influences. And there was a time, midway in this struggle, when cautious men were inclined to think that the manual skill and the practical usefulness of a dentist were pretty certainly in inverse ratio to his scientific knowledge of medicine. Indeed, a contrast used to be drawn between European and American dentists along this line; the Europeans being confessed the more scientific, but the Americans far more practical.

Such work as Harris', however, could not fail, and by slow degrees dentistry has come to its own. We no longer need to ransack the records of medicine for rare and doubtful cases which may show the reciprocal relation of teeth and nerve-centres, in order to prove that we deal with vital organs intimately associated with the general welfare of the system. Every division of the dental field is now known to demonstrate this abundantly; and a suggestive outline of the familiar facts is all we shall need here.

It is not worth while to dwell on mere curiosities. Almost every organ of the body has at some time been reported as having pathological relations with the teeth; but it may be doubted whether all these cases could have stood the test of modern research. At any rate the very rare ones can never be anticipated and seldom recognized, and may well be left out of our view.

Neither need we take up the sequels of inflammatory action produced by diseased teeth in the adjacent tissues; the periosteal tumor which sometimes long precedes the breaking of a chronic alveolar abscess; burrowing fistulæ which occasionally open far from the tooth; alveolar necrosis; affections of the antrum, etc. There is no mystery about these results and there can be no advantage in going over them here.

The remote relations of the teeth which still need study are effected either by the nerves, (whether the teeth are on the causative or the resultant side), or by general cachexias not well understood.

There can be no doubt that the constitution and the structure of the teeth partake of the general conditions of the system during the formative stage. This relation is a little obscured by the fact that the internal condition of teeth does not so readily fluctuate with changes of the general health as do most other tissues; because the process of nutrition and interstitial change is exceedingly slow. But during the formation of the teeth they are as easily influenced as other organs, and their subsequent condition, especially the difference often found in the same mouth between teeth of different periods, may frequently be accounted for by inquiring into the health of the child at the time when each order of teeth was forming.

A relation so easily established authorizes us to believe that a similar cause may some day be made out for more mysterious deficiencies of dental constitution, and pathological conditions be thus explained from within for which no study of their surroundings shows any cause.

But the history of teeth is not wholly determined by the circumstances of their formation. Many observations have proved that a slow circulation pervades the dentine, maintaining a correspondingly slow process of renewal and interstitial growth. This process certainly produces at times increased density, and the presumption almost amounts to certainty that it sometimes retrogrades and causes deterioration. The evidence of this is not easy to disentangle, but it grows in distinctness. It has long been observed that the teeth rapidly decay during or immediately after some attacks of prostrating sickness and some pregnancies. The cause usually assigned has been a pathological acidity of the buccal fluids; but it is now established by researches in bacteriology, that except at the very beginning caries depends very little on external conditions; and therefore, if the long recognized effects of sickness and pregnancy are facts, some cause must exist which acts within the tooth. And such a cause does exist which is exactly in the line of our present study. Experiments made by the writer some years ago, but never published, showed that when decay occurs in fairly well-formed teeth, a zone of dentine immediately surrounding the cavity of decay has a higher specific gravity and yields more ash than a similar section from a sound side of the same tooth. This necessarily means a new deposit of lime salts apparently resulting from the irritation of decay. Now such a deposit in itself is of course a local affair, but it implies a heightening of vital activity which must be traced back to nerve centres. And it may well be assumed that besides the increase of density, the increased vitality of the dentine hinders, *pro tanto*, the ravages of the bacteria. If then this be the normal check upon decay, anything which so cripples the nerve-centres as to prevent this opposition, leaves the tooth defenseless to its enemies, and destruction is far more rapid. Now to this failure of normal inhibition rather than to any local cause, the quick decay accompanying disease and pregnancy must be ascribed.

Another field of quick decay reinforces this conclusion. In advanced life, when the general strength is impaired, teeth which have borne the strain of a lifetime are seen to give way suddenly to decay, so that in a few months there will be little left of the crown except the enamel, the dentine being decalcified in mass. Of course something must have happened to make this possible and not only general reasoning but the fact that these teeth are remarka-

bly insensible under the excavator, indicates that the nerves which supply them have almost ceased to work.

From all these considerations it seems fair to conclude that the decay of teeth is far from being a purely local matter, and is greatly determined by the nerve-centres from which the teeth are supplied.

Another branch of dental pathology which was long treated as merely local, has come to appear still more dependent on general conditions—the whole group of pericemental affections loosely classed as Riggs's disease. Once every condition, from a slight marginal congestion to the suppurative inflammation of the whole membrane was called the result of "tartar;" and under this name were included both salivary calculus and the scales and stars of pericemental exudate which occur at all parts of an affected root. With this view of the cause it could not be doubted that some kind of local treatment would cure the disease; and the remedies warranted never to fail have been countless.

The fact is, however, that extreme deposits of salivary calculus, even masses as large as the tooth, are frequently found to have caused no worse trouble than a superficial inflammation with some absorption of the gum; while deep-seated lesions of the most fatal kind occur in mouths which have been kept carefully clean. There is some cause farther back. Of course bacteria are invoked to explain it all, and they doubtless play a large and aggravating part. But they cannot explain why one mouth welcomes and another rejects them under the same visible conditions.

This writing has been interrupted to see a case which perfectly illustrates. Two molars have been driven apart by the blow of a wedge-shaped antagonist. At every meal food packs tightly against the intervening gum, till it has receded far beyond the original level of the alveolus, forming a deep pocket between the teeth. Could any conditions be more inviting to bacteria—the deep, protected nidus, the ever renewed supply of food never quite removed, the air and heat and moisture of the mouth? And yet neither tooth shows the least sign of pericemental disease, and the depressed surface of the interdental gum is pale and healthy as the hard palate. Such cases, not very infrequent, prove that the whole is not stated when we have spoken of bacteria. The opinion of dentists is therefore inclining towards one or another constitutional state as the predisposing and sustaining cause of pericemental trouble. We do not yet know much about it. Perhaps gout or rheumatism is at the bottom of it; perhaps the condition, not well understood, which promotes nasal catarrh.

To these two conspicuous topics might be added odontalgia; but of this so much is superficially known and so little profoundly, that it is hardly profitable for discussion. It is enough to say that the pains of the teeth are as frequently unaccountable as any others. The great majority, it is true, are due to local irritation traceable if sufficient dili gence is used. But the commonest perplexity of dental practice is that one may do so much in one mouth without painful sequels, while so small a portion of similar treatment in the next mouth will prove disastrous.

Nor has as much been anywhere said as might be of fugitive and unaccountable pains in the teeth. It often happens that the most searching examination discovers no local cause and that nothing in the subsequent history throws any light on the matter. Of course such phenomena are to be referred to reflex-action. The fifth pair present so many points of possible irritation, and this is known to pass so readily from one branch to another, that it would be strange indeed if the teeth did not often complain of disturbances quite remote from them.

Irregularities of position constitute another topic which might occupy us. When all the cases have been subtracted which can be explained by mechanical causes, a few remain which are partly ascribed to heredity and partly left without any explanation. It is probable that further study of these will bring to light constitutional causes, perhaps reaching back to fœtal life. But the whole matter waits for patient investigation.

This review, then, while it shows very much yet to be accounted for, also shows that dental pathology is but a part of general pathology and can by no means be studied alone.

And yet when we turn to the dentist's daily practice, we are surprised to find how much all this may be left out of account, how overwhelmingly the troubles which he treats admit of purely local explanation and cure. Indeed, the man who broods beside his operating chair over remote causes and turns his best attention to general remedies, will by-and-by find that chair empty, and will learn that he is a practical failure.

Let us next view the matter, therefore, from this side and see to how great a degree dental pathology is local.

Nobody doubts that uncleanliness of the mouth promotes decay: and no theory of electro-chemical action nor any discovery in bacteriology can shake this long established result of observation. It is equally certain that the careful excavation and filling of any given cavity always retards and frequently ends forever the morbid process.

It is worth while to add that when filling is unsuccessful and the question is raised whether the tooth or the operation is at fault, most practical dentists will incline, (if the operation is not their own), to suspect a fault in the filling.

One cannot speak quite so forcibly of local causes in pericemental disease. And yet the results of local treatment are so often beneficial that local causes must play a large part, and the attempt to trace these disorders back wholly to constitutional causes must not only fail but must seriously interfere with the discovery of improved local treatment.

As for the local causes of odontalgia, they are very numerous and sometimes so hidden that a diagnosis of remote causation is always to be looked on with suspicion and most rigorously questioned. And this, with a little less emphasis, is to be said of dental irregularities.

It might seem that such a survey as has been here made leaves the whole subject in confusion, and dentists must again divide into two opposing camps as in earlier days—the medical dentists and the operators.

But this can never be. There is no room for such strife, and if it could be attempted, the contest would be too unequal and would be speedily fought out. For all theories are subject to the test of facts; and the fact is that the reason of our existence as dentists,

the warrant for the high estimation in which our art has finally come to stand, is the possibility of relieving dental troubles by local operations. No amount of diagnostic acumen or of scientific learning will make a man a successful dentist who cannot give prompt comfort and safe assurance of future usefulness to the mouths of his patients.

The writer hopes to be particularly understood as building, whether at the chair or in an essay, on the intelligent, patient, and skillful performance of dental operations, as the corner-stone of dentistry. Whatever we may discover or invent, the day will not come in our time when there will not be ravages of past disease to repair and conditions of present disorder to cure.

It will be indeed a happy day for the science of the teeth if there ever arise men with the leisure and the learning necessary to work out the meaning of innumerable facts separately collected and recorded by practicing dentists. A single such man devoting his life to this study and to the verification of such conclusions as might be drawn, would make for himself a name and for dental science new means of usefulness, so great that we can as yet hardly estimate them. But no man can possibly do this who is tied to the operating chair; and the zeal that works without fee combined with the fortune which makes this possible, does not yet seem to have fixed its attention on dental science.

Meanwhile what can we, who must do our daily tasks, also do towards broadening the horizon of dentistry, towards hastening the happy day when dental disorder shall be rather prevented than cured?

Dentists have long nursed this hope, and the present paper aims to add another impulse in that direction.

It is no violent exercise of imagination to fancy the dentist of the future receiving a new patient. The chair, the mouthglass, the probes will all be there, and the examination, tooth by tooth, as minute as now. Then will follow a series of questions covering the ancestry, the habitual surroundings, the personal history and habits of the patient, and at last the dentist will give his judgment. "You have such and such defects of the teeth," he will say, "which will all be duly corrected. You have this or that constitutional weakness which has caused or promoted your dental troubles. Or your diet, your occupation your habits are at fault, and it will be necessary to make changes thus and thus." After six months perhaps the patient will return, the examination will be repeated, the regimen approved or changed as results may have appeared. In a few months or years the patient will have ceased to have any further dental disasters beyond the inevitable wear and tear of hard used organs; and after two or three generations a race will be produced in whom dental disorders will rank with pulmonary or ocular diseases, always possible but commonly escaped.

No thoughtful dentist will say the picture is too flattering, yet how delightful it is. And how are we to realize it? By holding fast the conviction that behind the local cause and effect there are powerful general causes; that these are not simple and manifest but difficult to trace and much interwoven; and that therefore they are not to be discovered by catching up some theory of phosphates, or rheumatism, or bacteria, but by the most patient accumulation and comparison of cases which now and then give some valuable hint, and a slow induction of broad facts and general principles. As it will take several generations of patients properly guided to produce the dentition of the future, so it will take several generations of educated, diligent dentists to acquire the wisdom which may guide.

Perhaps it will seem a scanty outcome of so many words, but the conclusion of the whole matter is this: Besides the patient work of local treatment and repair from which we cannot escape, we must vigilantly watch and search for remote causes, we must question and compare unweariedly, we must nurse a wholesome suspicion of theories which explain too easily or too much; and we must count it a life well spent if, besides innumerable daily ministrations of comfort to our patients, we can at last contribute to our profession one step forward in a knowledge of the fundamental causes of dental pathology.

Discussion.

Dr. Talbot agreed with the essayist that the diseases of the teeth were often intimately connected with diseases of the system, and instanced two cases of patients suffering with pyorrhœa alveolaris who had been under his care, but for whom he had not found it possible to effect any permanent good. The disease of the teeth affects the general system, and the disease of the system affects the teeth. In both cases he had advised long ago that the teeth should all be extracted and artificial dentures inserted in their place. All the teeth are sound, and the patients would not consent to lose them, though it is the only course by which they can expect to enjoy life. The patients have now become so physically run down that it is scarcely possible for them to get from their homes to their offices. They were of gouty diathesis, and when they had excess of acid in the urine the teeth would be surrounded with pus, and so loose that they scarcely could be kept in their sockets. The age of the patients was about thirty-five to forty-two years, and the trouble had been running on for fifteen or more years.

To understand such cases it is necessary to study the whole systemic condition. So also in neuralgia we often find the cause in a distant part of the body; for instance, it may be in the uterus, it may be from dyspepsia or a gouty or rheumatic condition.

Dr. Marshall said that one of the patients of whom Dr. Talbot spoke had come into his hands. He first looked for constitutional cause for the trouble. There was no tartar on the teeth. He made up his mind the patient was gouty, and upon examining the urine found a large excess of uric acid. Upon inquiring into his habits it was learned that he was an excessive meat-eater. Being advised to limit himself in this regard he improved, but he will not give up his meat to the extent necessary to avoid the trouble, so now and then he returns for local treatment, which is given, and he is told to return the next day, but he never does. When he has the severe suppuration there is always excess of uric acid; no doubt the excess of uric acid or the gouty condition affects the suppuration as a cause.

ORAL MANIFESTATIONS IN METALLIC POISONINGS.

Read in the Section of Oral and Dental Surgery, at the Forty-third Annual Meeting of the American Medical Association, held at Detroit, Mich., June, 1892.

BY G. S. JUNKERMAN, M.D., D.D.S.,

PROFESSOR OF OPERATIVE DENTISTRY AND DENTAL CHEMISTRY IN THE DENTAL DEPARTMENT OF THE CINCINNATI COLLEGE OF MEDICINE AND SURGERY, AND PROFESSOR OF ORAL SURGERY IN THE MEDICAL DEPARTMENT OF THE SAME COLLEGE.

Many metallic poisons which are non-corrosive in character show the limit of their exhibition in the human system by manifestations of some nature in the oral cavity. Some of the corrosive metallic poisons also show this limit in the mouth. This is especially the case with the escharotic corrosive metallic poisons. In both acute and chronic metallic poisonings are found oral manifestations; but this

paper wishes to direct the attention to the oral manifestations arising from chronic metallic poisonings. There is a slight suspicion that the prolonged exhibition of arsenic, in proper doses to produce medicinal effects, may result in the death of the pulp of one or more of the teeth in the individual so treated. There is no authenticated case of this nature, but the theory of it, based upon a knowledge of the accumulative nature of arsenic, is a good one. Arsenic in its action has a predilection for glandular tissue, and if it accumulates in the liver, spleen, kidneys and lymphatics, why should it not use the lymphatics of the pulps of the teeth as storehouses? Upon the hypothesis of these pulp manifestations of arsenical poisonings can be explained the twofold nature of the drug arsenic, viz.: the corrosive and the neurotic; both of these effects being produced when the drug is applied locally, and only the neurotic effect being present from the internal administration of the drug and its subsequent accumulation.

Arsenic does not always destroy by corrosion but may, as it must in these cases, produce death of the pulp by over-stimulation.

If arsenical poisoning endangers the inner vitality of the teeth, their external vitality has also an agent of destruction in mercurial poisoning. Manifestations of mercurial poisoning are particularly marked in the oral cavity. Mercury has a selective action for the lymphatic glandular system, and the first indication of the presence of mercury is an increased flow from the salivary glands. Mercurial poisoning is very destructive to the peridental membrane. This destruction is usually permanent and is exhibited by soreness and subsequent looseness of the teeth. Mercury in all its forms is synergistic to a destructive metamorphosis. The vitality of the general system is lowered by its internal administration, and the general action of the drug is rather to destroy than to build up the human tissues. The death of pulps too often results from mercurial poisoning. This arises from the placing in too close proximity to the pulp of so-called *fillings* (?) made of amalgam. The most skilled operator cannot possibly give to a certainty the prognosis of a tooth treated with an amalgam filling. If the tooth escape mercurial poisoning it is solely due to the degree of vitality possessed by it or the diminutive size of the filling, preventing a sufficient supply of the poison to produce death to the pulp. Many cases of chronic mercurial poisonings require several years to manifest themselves finally in the destruction of the pulps. Teeth into which have been stored large quantities of mercury in the form of amalgam rarely retain the vitality of their pulps for any length of time. Unfortunately for future generations the tooth does not die the day and often not the year that it is killed. I do not wish to deviate from the proper course of this paper to enter upon a discussion on amalgam as a filling material. Most of us use it, and it seems to be a necessary evil; but it must not be denied that many pulps are destroyed by mercurial poisoning caused by its use. The injury from the much vaunted external evaporation and subsequent absorption in the oral cavity of the mercury from amalgam fillings, pales into insignificance aside of the cases of the absorption of mercury by the canaliculi from the inner walls of the fillings. There is no doubt that many obscure cases of a neuralgic nature might be explained from mercurial poisoning of this kind. The evaporation of mercury from fillings after they have become perfectly set is a theory and founded mostly upon the imagination. The absorption of mercury by the dental tubuli is a well authenticated fact which can be verified at all times. The specialist therefore as well as the general practitioner must shoulder the responsibilities arising from the administration of mercury; local mercurial poisoning destroying the internal vitality, and systemic mercurial poisoning destroying the external vitality of the teeth. The oral manifestation of lead poisoning is characterized by a blue line at the margin of the gums, usually on the inferior central incisors. In the internal administration of the drug the slightest appearance of this line marks the beginning of plumbism, and where the administration should be stopped. It is claimed by some good authorities that this blue line is due to the deposition of sulphide of lead and is only found in the mouths of individuals suffering from lead poisoning and who do not use tooth brushes.

If this is sometimes true it is not always the case, for I have found the line in persons with scrupulously clean mouths, and where all attempts to remove it by mechanical means were futile. The blue line must be explained upon some other hypothesis than a mechanical one. The mucous membrane seems to have a selective action for lead and the blue line is the inflammatory result of the deposition of this irritant. An argument against the mechanical theory also is that the deposition, if it proves to be such, is found in a place very freely bathed in saliva; while those parts of the teeth comparatively free from saliva show no signs at all. The blue line cannot always be taken as proof positive of lead poisoning. Mercurial poisoning will often produce the same condition; but a differential diagnosis can be made, if not by the history of the case by the number of teeth affected, the lead poisoning being restricted to the front teeth. What is more difficult is a differential diagnosis between lead poisoning and pyorrhœa-alveolaris in its first stage. The blue line in both conditions is frequently identical and we are compelled to depend upon the history of the case. This history often becomes very obscure from the patient's unwillingness to divulge the secret of her beautiful complexion or his brown or black metamorphosed head of hair. Time clearly determines the diagnosis, however, lead manifesting its characteristic constitutional symptoms and the arrival of the pyorrhœa-alveolaris at the pus stage.

The specialist is frequently the first called upon on account of the unsightly appearance of these blue lines; and this local symptom may for a long time remain the only sign of the trouble, there being no systemic symptom marked enough to attract the attention. This local lead poisoning may be brought about by the use of tooth powder. What occasion there is for making lead an ingredient of tooth powder may not appear clear to the intelligent practitioner; but that it has been found there is an authenticated fact. Powdered acetate of lead is usually the compound used, and its virtue to the stupid and unprincipled tooth powder-charlatan lies in its styptic and hæmostatic properties. If you have a case of lead poisoning do not be satisfied with examining the face powder and hair dye, but examine also the tooth powder used by the patient. There may be other metals that would manifest their poisonous properties in the mouth; but there are none which

on account of their use are capable of abuse and manifest their abuse in the oral cavity more than arsenic, mercury and lead.

Discussion.

Dr. Fletcher said he had not used any of the poisonous substances, with the exception of arsenic, for the devitalization of pulps, and had never seen the blue line on the gums indicating lead-poisoning.

Dr. Barrett did not think the death of the pulp caused by the application of arsenic could be due to over-stimulation, or to anything else than the corrosive effect of the drug. It has been claimed that it is caused by strangulation of the pulp, by causing a swelling of the pulp and a consequent constriction of the apical foramen. The falsity of this idea is proven by the fact that the effect is produced in children's teeth as well as adults', and it is well known that there is no apical foramen in children's teeth; and it produces the same effect on other tissues where there is no possibility of strangulation. As to mercury, we know that this substance has toxicological possibilities which no other substance has; that it is very unstable in its compounds, and apt to unite in new combinations when brought into contact with various substances, and so we need not be surprised at any effect produced by it, provided there be anything with which it could combine to produce a new compound; but he could not conceive that the mercury from an amalgam filling should be absorbed by the tubuli and go back into the system to work harm.

Dr. Talbot asked Dr. Barrett how he explained the dark color in and around teeth having amalgam fillings.

Dr. Barrett thought that in some cases at least it was caused by the union of some of the other components of the amalgam with the fluids of the mouth or teeth.

Dr. A. E. Baldwin said he was ignorant of the use of acetate of lead as an ingredient of tooth-powder, and thought such a reckless use of such a dangerous substance could not be too severely condemned. In regard to the argument of Dr. Barrett that the action of arsenic in the teeth of children proved that this drug does not effect the death of the pulp by means of strangulation, he did not think the proof was conclusive. There might be a strangulation in the blood-vessels, a constriction sufficient to cause the death of the pulp. And in regard to the statement in the paper of the absorption of mercury into the system through the canaliculi of the teeth, we can hardly accept that either. Amalgam is a chemical union of two or more metals, an alloy having peculiarities differing from those of any of the constituent metals, and the mercury could only be absorbed as a vapor. There are more idiosyncrasies of patients in regard to the use of mercury than of any other material. Some are disastrously affected by the mere contact of mercury with any of the membranes, even in small quantities.

Dr. W. W. Allport:—Just what the process is by which arsenic effects the death of the pulp is a mooted question; yet he has been inclined to believe that the theory advanced by Dr. Flagg several years ago, that it was by strangulation, is nearly correct. It seemed to him that a little thought would satisfy Dr. Barrett that the effects of arsenic on the pulp of a tooth and upon the soft parts of the mouth were entirely different. When arsenic is applied to the gum, the effect is continuous; applied to the pulp, death occurs within an hour. Another thing: it usually takes longer to destroy the pulp in the tooth of a child than in an adult.

As to the effect of mercury, we all know that teeth long filled with amalgam become brittle, showing that the mercury has affected the structure. This effect, it seems, must be from the evaporation of the mercury, and the vapor would naturally be in the direction of the least resistance —that is, between the filling and the tooth itself.

Dr. J. Taft said there could be no question of the effect of arsenic upon the soft tissue. A very minute quantity coming in contact with the gum will devitalize that portion of the gum and cause a slough. Some years ago a dentist announced a discovery by which a tooth firmly held in the jaw could be made so the extraction would be an easy matter. His plan was to take a fine string, moisten it, and after drawing it through arsenious acid, tie it around the neck of the tooth just below the edge of the gum. The action on the gum was such as to make the tooth easy of removal, but the after-effects of course were serious.

We cannot explain just how arsenic acts on the pulp; but the fact that the pulp to which it is applied is found to be disintegrated proves that the action is not strangulation.

In regard to the action of mercury on a tooth, when a tooth receives an amalgam filling the tooth-substance may be stained. This staining is not superficial; it penetrates the dentine; sometimes it is not very marked, and sometimes the dentine is blackened through and through from even a very small amalgam filling. This effect is produced by the penetration of the vapor of mercury into the tubules and its oxidation there.

It has been argued here that as amalgam is a chemical union of metals, it does not have the same characteristics of any of its component parts; but we all know that there is always an excess of mercury, so there is no doubt that the material for evaporation is there. Mercury will always vaporize at the temperature of the mouth, or even at a much lower temperature, down to freezing point. This may be tested by exposing a piece of gold foil where there is free mercury; within a few days the surface of the gold foil will be covered with mercury. The distance the vapor will penetrate into the dentine will be determined by the density of the structure. The vapor of mercury is so subtle that it is scarcely possible to get a joint tight enough to hold it. So we see that when teeth are filled with amalgam we have free mercury, and that the vapor will come from it, as the circumstances are in every way favorable. In very susceptible constitutions it is reasonable to believe that it may exert an influence on the general system. I think there are cases in which it does.

Dr. Talbot related experiments by which he had proved that the vapor of mercury was constantly given off even by very old amalgam fillings. He had had patients who had been injuriously affected by amalgam fillings. When the amalgam was removed and gold inserted, they had recovered. He said that he himself was an instance of unusual susceptibility to mercurial poisoning, and that if he should rub up two amalgam fillings in the palm of his hand each day for three successive days, he would be attacked by paralysis agitans.

Dr. Junkerman, in closing the discussion, said that the corrosive effects of arsenic when brought into contact with the soft tissues were well known, as shown when it is accidentally placed in contact with the gum. The stimulating effect upon the system is also well known, and can be tested any time by taking a dose of Fowler's solution. The effect is stimulating and exhilarating, but he thought the effect on the pulp was a corrosive one, as the disintegration of the pulp indicated.

That mercury is absorbed by the tubules of the teeth has been proven by extracting the globules from the dentine of teeth which have been long filled with amalgam.

As to the use of acetate of lead in tooth-powder, he had discovered it from the fact that he had a patient, a lady, who showed indications of lead-poisoning. To try to find the cause of the trouble, he asked her for a sample of her face-powder. This was furnished, and also a sample of her tooth-powder. The face-powder was found to be harmless, but on testing the tooth-powder he was astonished to find that it had the acetate of lead in it.

Dr. Clifford asked why, when mercury was used in excess in copper amalgam, the filling becomes black, but the teeth are not discolored?

Dr. Junkerman said it was possible that the oxide of copper formed, and prevented the absorption of the mercury by the teeth.

REMARKABLE SEQUENCE OF OPERATION FOR NECROSIS AT BASE OF SKULL: A NEW METHOD OF RESECTING THE THIRD BRANCH OF THE FIFTH NERVE.

Read before the American Medical Association, at Detroit, June, 1892.

BY G. LENOX CURTIS, M.D.,
OF NEW YORK.

About a year ago a case came into my hands for operation, which presented unusual features of interest from the surgical standpoint, not merely on account of the immediate results, but because of the suggestion which it afforded of a decided improvement in an important surgical operation.

On May 15, 1891, the patient, Miss M., aged 25, a professional nurse by occupation, presented a note from Charles

M. Magee, M.D., of Syracuse, N. Y., asking me to make a careful examination of her symptoms and condition, and stating his opinion that she had been suffering for the preceding five months from confined pus, somewhere at the base of the skull. He had, the note added, sent the patient to her dentist some two months before, but no trouble was found, though on the day previous to her coming to me the dentist had discovered pus coming from around one of the teeth.

The right side of the face was considerably swollen. The eye on that side protruded from its socket. The sight of the eye was, however, normal, while the left eye, which retained its normal position and was apparently not involved in, or related to, the trouble which had forced its companion out of position, was almost totally blind. With the right eye closed, the patient could merely distinguish the difference between daylight and darkness. Questioning her it was brought out that, as far as she knew, she had never had the use of the left eye. She had first detected the fact that it was useless to her at the age of seven years, and she had always supposed that its cecity had dated from her birth. She had no recollection of any traumatic injury to which the disability of the eye could be referred. Clearly there could be no connection between the present condition of the patient and the blindness, which was therefore dismissed from the consideration.

The history of the case from the time serious symptoms were first observed, is perhaps best told in the following statement of the patient:

"First appearance of head trouble was in the latter part of January, 1890, when I had an attack of la grippe; was confined to bed two days; in the house a week. Had more or less headache afterward, but no serious trouble until July of the same year, while in charge of a patient in the country; I was taken in the night with a severe chill, followed by headache and bone-ache. There was also a watery discharge from the eyes and nose, and I lost all sense of taste and smell. Did not seem to get over what appeared to be a cold in the head, but at the end of the second week after the chill, I went on duty again. The pain and fulness seemed to increase until the fourth day, when I was obliged to take to my bed. Had more or less ear-ache and faint turns and dizziness, and was brought home on my bed. Expected to have an operation performed, but on reaching home, it was decided that this was not best. Was confined to the house with this attack seven weeks, and was not able to work until the latter part of October. In January face was somewhat swollen, followed in February by a discharge from the right nostril; head was relieved as long as the discharge kept up, but when it stopped the pain and pressure were intense."

Examination confirmed the suspicion of Dr. Magee. On passing the electric lamp into the nostrils and posterior pharynx, marked opacity was observed thoughout the entire right superior maxillary region, and extending far back in the direction of the ear, indicating disease of the antrum of Highmore and congestion of the surrounding tissues. The patient's physical condition was so unfavorable, however, that it was decided to defer operation until she could be strengthened for the ordeal. She was accordingly placed on an anti-pyemic treatment, with such good results that on June 2, the operation was performed with the aid of Dr. Magee, who also administered the anæsthetic, and my regular assistant. As in most of these cases, the operation was performed through the mouth, so as to avoid a scar on the face. The first step was the extraction of the second molar on the left side, the second bicuspid and the first molar having already been lost. The wisdom-tooth, or third molar, was allowed to remain, as its removal was unnecessary and it would serve a good purpose as an anchorage in case a bridge piece of artificial teeth should be required. A flap of gum having been turned back the bone was cut away from between the anterior surface of the wisdom tooth and the distal surface of the second bicuspid, the alveolar process being removed with it, and the cut extending along the buccal surface of the superior maxillary bone about a half inch.

On entering the antrum, that cavity was found to be entirely filled with multiple mucous cysts, pus, and granulations, but there was no evidence as to the origin of the accumulation. The posterior wall was absent, and the edges of the bone surrounding the opening were rough and dead, showing that necrosis had occurred. In exploring beyond this opening an accumulation similar to that in the antrum itself was discovered, except that it contained no mucous cysts, being composed entirely of pus and granulations, extending as far back as the junction of the sphenoid and temporal and up on the zygomatic arch. The external surface of the pterygoid process and two-thirds of the greater wing of the sphenoid bone were entirely denuded of periosteum.

In all nearly a half-pint of diseased tissue was removed. The surface of the wing of the sphenoid, which was denuded, was necrosed, necessitating its removal with the bur and curette. As the necrosis involved the foramen ovale the nerve and artery were pressed aside to allow of the removal of the necrosis around the foramen. The necrosed bone removed, extended over the lower two-thirds of the external surface of the great wing of the sphenoid bone, the zygomatic surface of the external pterygoid plate, the entire zygomatic surface of the superior maxillary bone, and throughout most of the surface of the antrum, though the necrosis was less marked in this territory. Thorough cleansing was secured with carbolated solution followed by solution of bichloride of mercury. The entire woundwas then packed with iodoform lint, which was not changed until the fourth day. Fever was very slight, there having been only two degrees rise in temperature, and this subsided upon the redressing. The wound was dressed in the same way for two weeks, after which the dressing consisted of injections of bichloride of mercury and peroxide of hydrogen, twice a day, and carbolated solution every two hours. A gold tube was finally put in the antrum, attached to the wisdom tooth, to facilitate syringing out the closing wound, and as a drainage outlet, and in due time was removed. The patient was able to attend to the dressing of the wound herself after four weeks following the operation, and the case progressed favorably and rapidly. The wound in the jaw soon closed almost entirely, there remaining only an opening just large enough to pass a probe through with difficulty. There is no deformity of the face. The right eye, with the removal of the cause of its protrusion, has returned to its normal position. The patient's health and strength have been entirely restored, she having gained twenty pounds in weight since the operation, and having a greater degree of vigor than for years previous. She has been able to pursue her accustomed vocation for some ten months.

The remarkable feature of the progress of the case after operation was the establishment of sight in the left eye. It will be remembered that the patient had no recollection of ever having had any degree of useful vision with this eye, that, so far as she was aware, it had been blind from her birth. The first indication of incipient visual power in this eye was observed on the third day. On the fourth or fifth day the patient could count with the left eye unassisted, the fingers on a hand held at a distance of four feet. In two weeks she was able to distinguish objects with some degree of clearness, and could recognize those about her. By September the sight had strengthened so that she could read the head-lines in a newspaper, two months later even small capital letters were easily read, and gradually, with the aid of a strong glass, ordinary print could be deciphered without difficulty.

This surprising and gratifying result opens up a wide field for speculation as to the ultimate and proximate causes of the previous blindness of the eye, and, as well, the *rationale* of the removal of this defect. Little is hazarded in the conjecture that the point of interference with the natural office of the optic nerve, was probably at some portion of the optic tract on the right side, since this region was involved in the territory of diseased tissue, and the affected eye was on the opposite side from the lesion operated for. It is, perhaps, not necessary to rehearse here the anatomy of the parts, a brief study of which will show that it is scarcely possible that the malign influence could have been exerted elsewhere.

As to the character of the interference, it would seem to have been in the nature of pressure producing a form of strangulation, which inhibited the normal function of the optic nerve. The history would lead also to the suggestion that the beginning of the

formation of broken-down tissue was made very early in the life of the patient, perhaps from a tumor at birth, which impinged upon the optic tract, and thence extended slowly, passing downward through the spheno-maxillary fissure, and by pressure absorbing and destroying the soft and hard tissues in its course, until the posterior wall of the antrum was broken down, and the antral cavity itself became choked with the products, the attack of *la grippe* acting simply as the spark to fire the mine which had been so long preparing. The subsequent train of symptoms is self-explanatory in the light of the condition shown by the operation.

Of course, it would be interesting and instructive to be able to determine exactly what was the primal factor in setting up the disturbance. The hypothesis above advanced seems the more reasonable in view of the fact that the idea of traumatism is scarcely admissible. The possibility of adenoids being at the bottom of the mischief may also be advanced, but guesses at the remote origin of the difficulty would now be futile.

It would be vastly more profitable to consider a fact which the operation conclusively demonstrated, namely, that resection of the third branch of the great trifacial at the foramen ovale, can be accomplished in a much more skillful manner than that now commonly employed. As is well known to you, the usual method is to cut from the outside, and the equally usual sequence is an unsightly scar upon the face. In the case described I did not resect the inferior maxillary nerve, but I did curette the necrosed bone away from around it, and I could distinctly see the nerve and most of the bone which was curetted. This would indicate the entire feasibility of reaching the third division of the fifth nerve when it is necessary to resect it at the foramen ovale by operating within the mouth. The parts are as readily accessible as by external operation, the wound heals readily, and no deformity will be caused. In operating after the suggested method, it should be borne in mind that the wounds in the mucous tissue of the mouth are liable to become niduses for the propagation of infectious bacteria, and it will therefore be necessary to guard against such a possibility by the adoption of the proper precautions. This, however, is no more than is requisite in the external operation.

THE FORTHCOMING REPORT OF THE BUREAU OF EDUCATION ON PROFESSIONAL EDUCATION IN THE UNITED STATES.

BY BAYARD HOLMES, B.S., M.D.
SECRETARY OF THE COLLEGE OF PHYSICIANS AND SURGEONS OF CHICAGO.

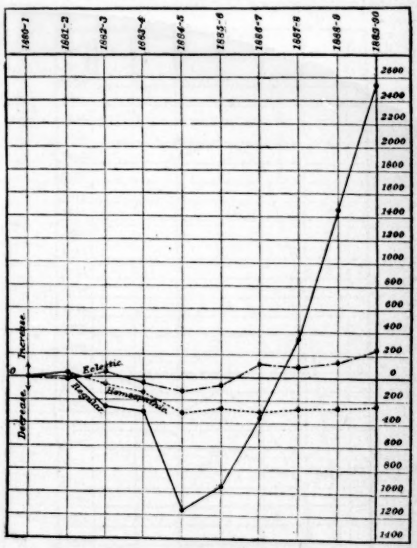
It has been my pleasure and rare opportunity to look over the proof sheets of chapters IX and X in the forthcoming *Education Report 1889-90* on professional schools. These chapters have been prepared by Wellford Addis of the Bureau.

MEDICAL SECTS.

One is pleased to see the diagrams which show such gratifying improvement in many directions. Thus, at this time, when the question of "the code or no code," is separating the American Medical Association into two factions with age and dignity on one side and youth and humanity on the other, a glance at Diagram 14, which is here reproduced will convince the most fearful that the abuse and misinterpertation of a single clause in the code need not shatter that almost inspired document. The equitable adjustment of the "medical sect" question can be furthered by devotion to higher objects in medical education. Some of these objects will be set forth in this article.

DIAGRAMS OF PROFESSIONAL EDUCATION. 855

DIAGRAM 14.—*Showing fluctuation of attendance at the schools of each of the three medical sects in the United States during the period 1880–90.*



In looking over the statistics of the medical schools in Germany and France, one is surprised to see the strong advance of medicine in Germany during the past fifteen years. The actual fact of this advance is put forth by Diagram 1. To appreciate what this increase in the number of medical students in comparison with students of law and theology means, it must be remembered that in Germany the professional schools are integral parts of the University. Entrance to the professional schools depends on the previous completion of the course in philosophy, *i. e.* it depends on completion of a course at least equal to that represented by the A.B., or B.S., degree with us. Notice the fact that as medicine became more a science and especially as pathology became more carefully studied (1876 *et seq.*) and as surgery became under the use of antiseptic methods more successfully practiced, that the number of aspirants for a medical career rapidly increased. As we all know, medical literature has been enriched more by German labor during this period than by the labors of all other nations. The same activity is not to be found in any other department of University educa-

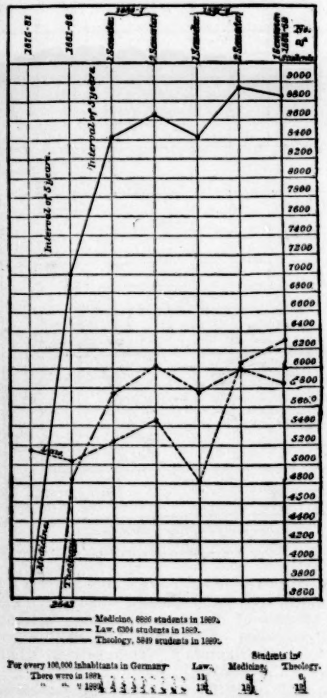
tion though there is a similar though lesser wave in the attendance in theology. This parallel between medicine and theology is to be found in almost any table.

In France, where education is bureaucratic from Kindergarten to the National Academy, much the same increase in attendance in the medical schools is to be seen. But, as I believe, because medicine was relatively in a much better condition in France at the beginning of the antiseptic period than in Germany, this rise is not so noticeable. Law is relatively more prominent in the University in France than in Germany. In 1880, in each 100,000 inhabitants in France, there were 11 students of medicine and 14 students of law. At about the same time, in Germany, there were 8 students of medicine and 11 students of law to the same unit of population. This changed so that in 1888, France had 17 students of medicine and 14 students of law, and Germany had 18 students of medicine and 13 students of law to each 100,000 population.

It is interesting to compare the attendance of American professional schools with the preceeding statistics. It must be remembered that the American professional schools are not parts of Universities in any such sense as they are in Germany. Most schools of law, medicine and theology are open to any applicant with even the rudiments of a "common school education." The course of study is shorter and, in medicine, graduation entitles the holder of the diploma to license to practice. From all of these causes and because our people require and pay for more, if not for better, medical service than the Germans and French, the ratio of medical students is, with us, absolutely and relatively greater than in either of these countries. Thus in 1881, in the United States, there were 25 students of medicine, 6 students of law and 9 students of theology to each 100,000 inhabitants, while in 1890 there were 24 students of medicine, 7 students of law and 11 students of theology in the same unit of population.

838 EDUCATION REPORT, 1889-90.

DIAGRAM 1.—*Showing movement of the enrollment in the faculties of law, medicine, and theology, in twenty-two German universities during thirteen years.*

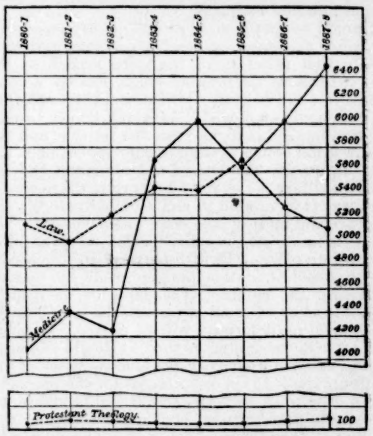


Students to			
For every 100,000 inhabitants in Germany	Law.	Medicine.	Theology.
There were in 1881	11	8	6
" " " 1889	13	18	13

840 EDUCATION REPORT, 1889-90.

DIAGRAM 2.—*Showing movement of the enrolment in the State Faculties of Law, Medicine, and Theology in France during eight years.*

[Scale same as diagram 1.]



Students in		
For every 100,000 inhabitants in France	Law.	Medicine.
There were in 1881	14	11
" " " 1889	14	17

ENDOWMENT OF PROFESSIONAL SCHOOLS.

We have complained in these columns and elsewhere of the neglect of medicine by the Universities of the United States.[1] This becomes apparent when we consider the amount of financial support schools of medicine receive from University corporations and from States.

The *productive funds* in the hands of medical schools, both those connected with and those independent of Universities in the United States was in 1889, $249,200 while at the same time there was in the hands of schools of theology, productive funds to the amount of $11,939,631. The value of buildings and grounds used by medical schools at the same time was $4,047,618, and the theological schools were accommodated with buildings and grounds

[1] V. Article by the author. Journal Am. Med. Assn. July, 1892 and University Magazine October, 1892.

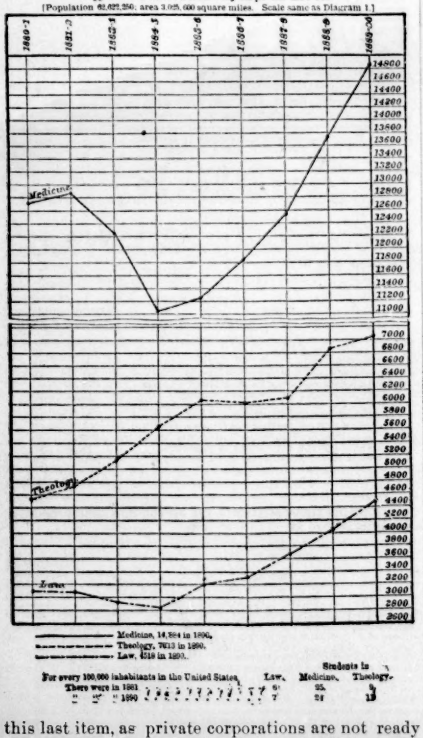
valued at $7,762,095. It must be remembered that in the case of the medical schools these buildings and grounds were covered with mortgages. This was not often the case with the theological schools.

The contrast is still greater when we consider the number of students, the receipts from fees, and the expense of these schools outside of salaries of teachers. Unfortunately it is impossible to give

842 EDUCATION REPORT, 1889-90.

DIAGRAM 3.—*Showing movement of enrollment in schools of law, medicine, and theology in the United States during the period 1890-90.*

[Population 62,622,250, area 3,025,600 square miles. Scale same as Diagram 1.]



this last item, as private corporations are not ready to open to the public their financial affairs. The medical schools had in 1889, 12,238 students who paid tuitions to the amount of $763,761, while at the same time the theological schools enrolled 6,989 students.

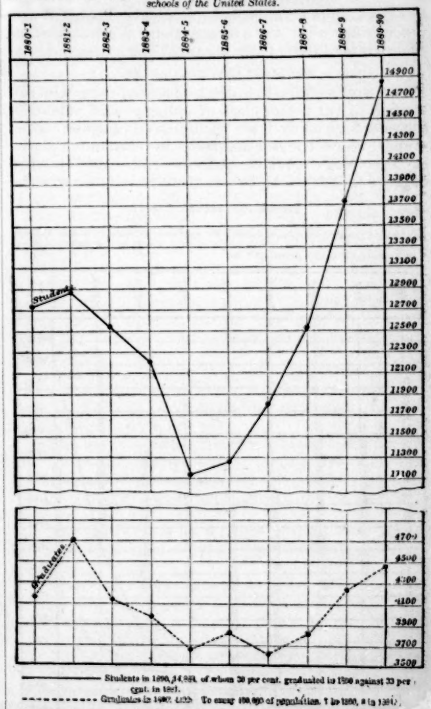
I am able to reinforce these figures by an abstract of the statistics for medicine, theology and technology as reported to the Bureau in June, 1892. The medical schools possessed buildings and grounds in 1892 valued at $7,507,937, and productive funds amounting to $611,214. Medical departments of State universities also received State aid in 1892 amounting to $40,500, which, if capitalized at 5 per cent., would be equal to an endowment of $810,000; making a total endowment of $1,421,214. There were 16,731 medical students in attendance.

The theological schools report productive funds amounting to $17,599,979, and stated, at the same time, the value of their buildings and grounds was $10,720,860. They had 7,672 students in attendance.

Technological schools report productive funds amounting to $13,229,940. These institutions received from State appropriations or municipal aid in 1891–92, $747,504, which, if capitalized at 5 per cent., would be equivalent to an endowment of

854 EDUCATION REPORT, 1889-90.

DIAGRAM 13.—*Showing enrollment and graduates for the period 1890-90 in medical schools of the United States.*



$14,950,080; making a total endowment for schools of technology of $28,180,020. There were enrolled in the schools of technology 10,921 students, about one-third of whom were in preparatory courses. It will thus be seen that the endowment of theology is increasing at the rate of about two million dollars a year. The technological schools are well provided for, but medicine has scarcely raised its endowment, even at the most liberal estimate, to a million and a half.

COURSE OF STUDY.

Diagram 13 shows that, making allowances for ordinary loss of students from year to year, the length of the medical course was hardly three years in 1890; as the graduations are thirty per cent. of the enrollments. This allows a loss of only three per

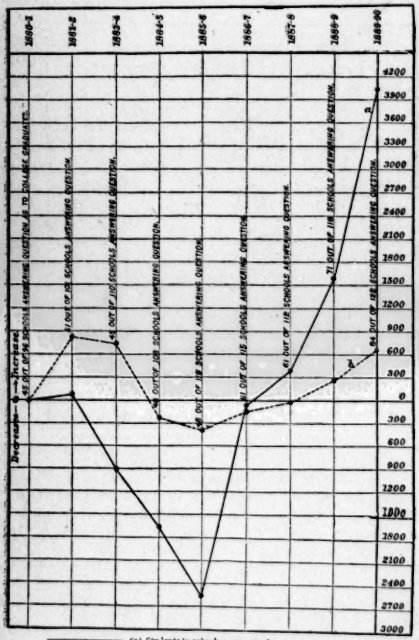
cent. in two years. This experience has shown is quite five per cent. a year.

The course of study is again abbreviated by the absurb custom of having medical schools open only one half the year. This means that almost 5,000,000 of dollars lie unproductive one half the year. In dollars, this is a loss of $250,000 a year. In educational units, it means that students receive only two-thirds the training they are supposed to receive. In plain English it means that in the United States in 1890, 4,500 men were given the degree of Doctor of Medicine after studying, on an average, less than eighteen months in medical school. When we consider what the average medical schools offers each winter this is truly an appalling statement.

PRELIMINARY EDUCATION.

Is it any wonder then that educated men, who are trained in our better class of colleges and scientific schools, turn away from medicine in disgust. Diagram 15 shows the relation between total matriculates in reporting medical schools and those having degrees in letters and science in the same schools.

DIAGRAM 15.—*Showing relation between the number of students in certain medical schools of the United States, and the number of these students holding degrees in letters and science, during the period 1880–90.*



(a) Students in schools represented.
(b) Students holding degrees in letters or science in schools represented in (a) above.

That portion of the report which deals with this subject is worthy of reproduction here.

"Of the 96 institutions reporting to the Bureau in 1881, 42 returned 1,111 students having a degree in letters or science, and three reported definitely that they had no scholar with a degree. In these 45 institutions there were 6,625 students. Thus in every 100 students there were 17 who it may be said had been liberally educated. If the other institutions (51) had reported specifically that they had no students who had received a degree in letters or science the whole attendance as far as reported to this Bureau (11,399) could be, and no error occur, compared with the number of students who were reported as having obtained a degree by the schools which answer the question definitely in the affirmative or negative. If we assume, however, that these 50 institutions had no matriculate in attendance having a degree in letters or science, then to do justice to the several parts of the country, comparison may take the following form:

1881.	New Eng. and Mid. States.	South Atlantic States.	South Central States.	North Central States.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Ratio of Matriculates having a degree in letters to students in all medical schools in each section of the country	14	6	2	7
Ratio of matriculates having degrees in letters or science to students in medical schools that reported students with such degrees in each section of the country	20	11	8	15

Continuing this sifting process by considering eleven schools of medicine which are departments of a university, it happens that at:

1881.	Attendance.	Had deg. in letters or science. Per cent.
Harvard Medical School	243	49
Yale Medical School	21	48
Coll. Physicians and Surgeons (Columbia College)	547	34
Medical Department of the University of Penn'a	375	26
Medical School of Maine (Bowdoin College)	112	20
Medical Dep't of the University of City of New York	623	19
Medical Department of the University of Vermont	50	12
New Hampshire Med. Institution (Dartmouth Coll.)	94	7
Dep't of Medicine and Surgery, University of Mich.	380	10
Medical School of the University of Missouri	40	43
Chicago Med. Coll., Northwestern University	150	20
Total	2,635	Average, 22

Considering the statistics of the eleven individual medical schools as before at

1889–90.	Attendance.	Had deg. in letters or science. Per cent.
Harvard Medical School	290	43
Yale Medical School	55	30
College of Physicians and Surgeons (Columbia Coll.)	619	36
University of Pennsylvania, Medical Department	485	26
Medical School of Maine (Bowdoin College)	81	21
Medical Dep't of the University of City of New York	633	17
Medical Department of the University of Vermont	205	19
New Hampshire Med. Institution (Dartmouth Coll.)	83	16
Chicago Med. College, Northwestern University	237	3
Dep't of Medicine and Surgery, University of Mich.	374	10
Medical School of the University of Missouri	21	6
Total	3,081	Average, 23

Finally let us consider the statistics of the year 1889–90. 110 institutions have reported to this Bureau, 78 of which reported definitely the number of students having a degree in letters or science, or they have no student possessing such a degree. In these 78 schools 15 per cent. of the matriculates had obtained a degree before entering upon the study of medicine. The absolute figures are, *sixteen schools with no students enrolled who had obtained a literary or scientific degree*, 62 schools with 1,382 students having a degree; total enrollment in the 78 schools 9,389. Adding to the enrollment of the 78 schools the enrollment of the 32 which answered "don't know" no data, etc., the total enrollment of the 110 schools reporting is 13,793. Comparing the enrollment in these 110 schools with the number of matriculates reported by the 78 schools as having degrees, *the result is that 10 per cent. of the enrollment in the medical schools of the country were possessors of a degree in letters or science.* Considering the States by sections and including only the 78 schools which reported

15 per cent. of their matriculates having a degree in letters or science it is found that 18 per cent. of the matriculates in the medical schools of the North Atlantic division had a degree in letters or science, 13 per cent. of the South Atlantic division, and 18 per cent. of the South Central division (including Tulane University estimated at 25 per cent.), of the North Central division, and 9 per cent. of the Western division. These figures show a diminution for the schools of the North and an increase for those of the South.

From the foregoing statements it appears that there has been a slight *reduction* in the number of matriculates (17 in every 100 in 1881, 15 in every 100 in 1890) at medical schools, who had received a degree in letters or science; while the statistics of the eleven departments of universities (where one would expect a large per cent. of the matriculates to have obtained degrees) show that there has been an increase of but 1 per cent. in the matriculates who had obtained a degree in letters or science. Indeed in the instance of the College of Physicians and Surgeons (the medical department of Columbia College) of New York City a decrease of 2 per cent. is shown when the per cent. of enrollment for the decade 1870–80 (37 per cent.) is compared with that for 1880–90 (35 per cent.); or comparing the per cent. for the first half of the decade 1880–90 with the second half, a reduction of over 3 per cent. is shown.

The question then is: Has there been no improvement in the scholarship of the matriculates at medica lschools?

The first of several questions asked on the form of inquiry sent out at the close of the school year 1889–90 was "Have you noticed during the last decade that the students of later years were, in a scholastic sense, better prepared to enter upon the study of medicine than those who preceded them?" Of the 86 regular schools reporting, 75 answered the question, 67 in the affimative and 8 in the negative. Of 7 eclectic shools only one answered 'No." Of 13 homoeopathic schools 12 answered "Yes," one fails to answer.

How are these facts to be reconciled? Statistics show that the number of matriculates having a degree is not increasing relatively to attendance. (page 879. See diagram 15), and yet the medical schools are almost unanimous in asserting that there has been an advance in the scholarship of the matriculates. Is this unanimous report as to the advanced scholarship to be attributed to an increased attendance at the medical schools of the country? Are more graduates of high schools matriculating at medical schools? If we compare the attendance of secondary schools (exclusive of public schools and departments of normal schools and of institutions for superior instruction) for 1880–81 with that for 1888–89 we find that there has been an increase in the attendance of schools for secondary instruction of 13 per cent. If we compare the attendance at the public high schools of 132 cities for 1880–81 with the attendance in the public high schools of these cities in 1887–88 an increase of 37 per cent., is shown. Or, speaking upon the subject from the still more general standpoint of population and considering that the public high school is always a feature of urban life, it may be concluded that the increase in urban population during the decade 1880–90 has increased the high school attendance of the country at large.

Some confirmation of the idea that the improvement in the scholarship of matriculates at medical schools is due to the high school, is found in the great protest against secondary and collegiate education because it tends to overcrowd the learned professions, especially those of law and medicine. But a protest is entirely too insecure a foundation to build a theory upon. What is necessary is information as to the localities whence the matriculates of medical schools come, whether from towns and cities or from the rural districts, for public high schools with few exceptions are located in the centers of population and rest on a system of grades beneath them from which they are fed. The public high school of the rural districts it should be said is in many cases the State normal school or agricultural college.

In examining the reports made to the Bureau some expressions are found that corroborate what has been suggested above. A medical school of California in answering the question as to the better scholarship, answers "Decidedly so," and adds, "18 had attended universities, academies, or colleges, 12 were graduates of high schools, 17 were graduates of the State Normal school or held educational diplomas or first grade certificates, and 40 passed examinations." A Southern school in denying improvement, adds, "The common school system has destroyed the private schools, and only an elementary education can be had outside." (There is no normal school in this correspondent's state). The medical department of the celebrated University of the Northwest replies, "Our students average far better now than formerly, and nearly all who enter now (who are not possessors of a degree) are graduates of high schools." While one of the foremost universities of the Southwest reports in the affirmative, adding, "Many of our matriculates being graduates of high schools or universities." A college of Ohio makes a very striking answer in saying, "Yes, as to students who enter under 25 years of age, no, to those who enter above 25 years." And a Southern college answers, "I have noticed an improvement in this respect, but it must be remembered that the students from the South now seeking admission to our colleges received their education (literary) during the decade following the war when educational matters were chaotic.

Of 110 schools, 86 answer the question; "Has the average age of matriculates advanced?" Two-thirds of these answered no, and ten of them say the average age has diminished. The Hospital College of Medicine (Central University) reports the age of seniors in 1880 as 26, in 1885 as 28, in 1890 as 27. One college reports, "Age diminished, mental calibre advanced."

It cannot, then, be doubted that relatively a smaller number of medical students have the bachelor's degree than in 1880, though the education of the average medical student is superior to the education of the average medical student ten years ago.

Last summer, many of the college journals gave in the June number the statistics of the graduating class. I selected out seven such compilations and noticed an astonishing series of figures under the caption "Prospective Calling." Almost forty per cent. of the June graduates were put down for law, about the same number for theology, while only about five per cent. had selected medicine for their future study.

This shows evidently that medicine is not attractive to the college-bred man. In this connection we must consider the following propositions:

1. Medicine does not pay.

2. The study of medicine is not attractive. *a*. The subject is inherently repulsive and uninteresting. *b*. The conduct of medical schools makes medical education repulsive and uncongenial to an educated man.

3. The instructors in colleges and universities do not encourage men to take post-graduate study in medicine.

4. University corporations do not credit work done in medicine and reward it as they do work in other departments.

Let me consider the propositions one by one.

1. Medicine does pay as compared with theology for the average man. The reward comes slowly because there is less opportunity for a physician to distinguish himself and attain an acquaintance and reputation rapidly. But the financial reward of the best men in medicine is about five times as great as in the ministry. The financial reward in medicine all the way down the scale is greater, as evidenced by the number of aspirants for medicine among the uncultured as compared with the number of aspirants from the same class for theology. Figures are not at hand to show the exact income of physicians and theologians, but in any community examples can easily be recalled sustaining these assertions.

We must admit that financially law pays better than medicine to the superior man. But here medicine has an advantage in that constant incentive to the cultivation of the best qualities of character which it affords, while law, more than mercantile or commercial pursuits, tends to undermine the best qualities of man and crystallize the best emotions,

sentiments and aspirations. Still it seems to me medicine pays too well to secure only five or ten per cent. of the annual output of college graduates. We must look elsewhere for the cause of this movement.

2. The study of medicine may be unattractive from two different causes. *a*. It may be inherently unattractive to college-bred men. We may safely assert that this is not the case, but that on the contrary it has combined in it all the attractions of the natural sciences with the personal interest which adds so much to the humanities. Again, by consulting Diagram I it will be noticed that medicine is the most popular profession in the opinion of the graduates of the German universities. A knowledge of the thesis literature of the German universities gives one the opinion that medicine furnishes the ideal field of scientific study.

But if medicine is sought by the educated German and is neglected by the educated American, may it not be the fault of the medical schools themselves? Largely I believe it is. This has happened from many and from widely separated causes. Medical education has not been controlled by educators, but by clinicians. The antique methods of the Revolutionary period prevail in the great majority of medical schools to-day. Even in those medical schools that are most intimately connected with State or private universities, other rules and other methods than those of the literary and technological departments prevail. In the report which furnishes the material for this article, we are astonished to find that in one of our university medical schools the course of lectures is so arranged that each student hears every lecture repeated the second year of his attendance and then passes his examination and graduates. Can any educated man endure this, in this last decade of the nineteenth century! The fact is apparent to any student that medical schools are run for the good and profit if not for the glory of the professors. These men want quick returns and they adapt their instruction to the unevolved mental maws of the students that come in the greatest numbers. Such pap the college-bred man does not relish. To such instruction the university teachers do not recommend men for post-graduate work. To such instruction the American university too often gives its name though withholding its support. Let me omit to speak on propositions 3 and 4.

In conclusion, let me make the following deductions:

1. The average course of study in the United Sta'es is still less than three years; *i. e.*, eighteen months.

2. The antiquated method of repetition still prevails in the majority of medical schools.

3. The number of students of medicine is absolutely increasing but (in relation to population) relatively diminishing. The homœopathic and eclectic schools are hardly holding their own.

4. The education of the average medical student is superior to that of ten years ago, but the ratio of matriculates having degrees in science or art is actually diminishing even in the richest, best located and only endowed medical schools.

5. The medical department is, so far as we know, neglected by every university in the United States, it is farmed out or left to shift for itself on half rations, or in the best instances, treated from an educational standpoint in an exceptional manner.

6. Medicine is neglected by the benevolent and by the State. From the former it has received almost nothing and from the latter not a tithe of what has been lavished on technological schools, and this in spite of the fact that the State and all benevolent institutions have put a heavy task of gratuitous and often compulsory service on the medical profession.

7. The medical schools are wasting their substance by keeping their doors shut half the year, and they are degrading the profession by allowing uneducated men to matriculate and uncultured men to graduate.

8. The laws which allow the diploma to become a license to practice, put the short-term-no requirement schools in a position to dictate to the schools that offer a medical education in place of a degree.

EYE TROUBLES WHICH CONSTITUTE A FREQUENT SOURCE OF HEADACHE, VERTIGO AND NAUSEA, AND OTHER NERVOUS DISORDERS.

Series of four lectures delivered at the Fourth Special Course of the Chicago Policlinic.

BY F. C. HOTZ, M.D.,
PROFESSOR OF OPHTHALMOLOGY.

FIRST LECTURE—ANOMALIES OF REFRACTION.

It has of late years become more and more generally understood that certain affections of the eye have a far reaching effect upon the nervous system, and are a prolific source of nervous disorders. The clinical evidence now in our possession is so abundant and strong that this causative relation between the eye and certain neuroses can no longer be treated as a mere theory, but must be accepted as a positive fact. As the clear understanding of this relation is of the greatest consequence in the successful management of numerous nervous complaints you are called upon every day to relieve, I thought in looking for a practical subject for these lectures I could not choose any that would interest you as much as the "Ocular Affections which Constitute a Frequent Source of Headache, Vertigo, Nausea, and other Nervous Disorders."

For this purpose I have arranged these ocular troubles into four groups.

1. *The first group* embraces those cases in which the cause of nervous troubles can be traced to an abnormal state of the refraction of the eye.

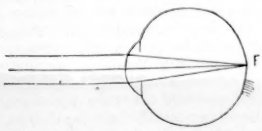
In order to make clear this connection of the nervous system with the refraction of the eye, it will be necessary to devote a few minutes of our time to a consideration of what we call refraction and accommodation.

By *refraction* is meant the optical condition of the eye when in a state of absolute rest; by *accommodation*, the faculty of altering the refraction to suit the varying optical requirements of the eye to see with equal clearness at varying distances.

Refraction is a power the eye has in common with any convex glass lens; it is the power of changing the course of rays of light passing through it in such a manner that eventually they will all come together in one point called focus. The normal eye (Fig. 1) is so constructed that parallel rays of light (*i.e.*, rays coming from a very long distance) are united in a focus (*f*) exactly on the retina; and this state of refraction is called normal, or *emmetropia*. But the refraction departs so often from the emmetropic

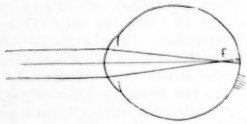
state that if you examine any 100 eyes you will always find the emmetropic eye in the minority; the majority of eyes will show either of the following conditions of abnormal refraction:

FIG 1



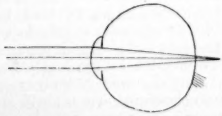
1. *Myopia* (Fig. 2): the rays of light are brought to a focus, (*f*) before they reach the retina:

FIG 2



2. *Hypermetropia* (Fig. 3): the rays reach the retina before they are focalized:

FIG 3



3. *Astigmatism:* the rays cannot be united in a single focus at all, but the surface of the cornea being differently curved in two opposite directions or meridians (which are perpendicular to each other), there is a marked difference in the refractions of these two meridians, and the rays passing into the eye through the one meridian are brought to a focus sooner than the rays entering through the other meridian. By this peculiar inequality of the corneal meridians, the following kinds of astigmatism are possible:

1. *Simple myopic astigmatism* — refraction in one meridian emmetropic, in the other meridian myopic.

2. *Compound myopic astigmatism*—refraction in both meridians myopic, but the myopia of the one meridian greater than the myopia of the other.

3. *Simple hypermetropic astigmatism*—emmmetropia in one and hypermetropia in the other meridian.

4. *Compound hypermetropic astigmatism* — hypermetropia in both meridians; but greater in the one than in the other.

5. *Mixed astigmatism* —myopia in one, and hypermetropia in the other meridian.

The degree of abnormal refraction is determined by the optical value of lenses. If we place a convex lens before a hyermetropic eye, (which as you have learned by Fig. 3, cannot bring parallel rays to a focus on its retina) the rays are made convergent before they enter the eye, and therefore are brought to an earlier focus; thus, convex lenses as it were increase the refractive power of the eye and therefore we can find for every hypermetropic eye a convex lens which will increase its refraction just so much that the rays are focalized exactly in the retina. The value of this convex lens represents the amount of refractive power the eye is wanting in order to be emmetropic; in other words it expresses the refractive deficiency or the degree of hypermetropia. In a similar manner we can find for every myopic eye a concave lens which makes the rays just divergent enough before their entrance into the eye, that they will now be focalized in the retina. The value of this concave lens indicates the amount of refractive power the myopic eye has too much to be emmetropic; or in other words, it indicates the degree of myopia.

In order to have a definite and uniform scale of optical values, oculists have adopted as the unit a lens of one meter focal length, which is called a *dioptry*. A lens which shortens the focal length to half a meter, must of course have twice the refractive power of one dioptry, and therefore is numbered 2 (2 D.), while a lens with a focal length of two meters can be only half as strong a one dioptry, and is called one half dioptry (.50 D); and now such symbols as M 2 D., or H. 4.50 D., will be no hieroglyphics for you any longer; you will understand them at once to mean: myopia of two dioptries, or hymetropia of 4½ dioptries.

If you throw the rays of a gas jet through a convex lens upon a cardboard, and slowly move the cardboard away from the lens, you will see a distinct inverted image of the flame appear upon the card when it is removed to a certain distance from the lens. This distance corresponds with the focal length of the convex lens, and if in the experiment the card is brought nearer to or farther away from the lens than the focal distance, the image of the gas flame becomes indistinct. Just as this convex glass lens produces an inverted image upon the card, so do the refractive substances of the eye (cornea, lens and vitreous) produce inverted images of outward objects upon the retina.

If these retinal images are sharp and distinct, we see the objects well; if the images are indistinct, our sight will be blurred. As these retinal images are distinct only when the rays are focalized on the retina, and as this is only done by the emmetropic refraction, the emmetropic eye is the only eye which sees a distant object distinctly by means of its refraction alone. But the clear sight of the emmetropic eye even would be limited to long distances; it would be very imperfect at a short range if it had not the power of accommodation. That an emmetrope can see an object distinctly whether it be 60 feet or 6 inches from his eye; that you can recognize a friend several blocks away, and can read small print, this extensive range of clear vision you owe to the power of accommodation by which the eye is enabled to increase the refractive power just so much as it is necessary for the production of a sharp retinal image of the nearer object.

These variations of the refraction are produced by alterations of the convexity of the crystalline lens through the action of the ciliary muscle; when its fibres are contracted, the lens becomes more convex and thereby more refractive; hence, whenever in the interest of distinct vision an increase of the refraction is needed, this demand is met by a corresponding contraction of the cilary muscle. In the emme-

tropic eye this action of the ciliary muscle is needed for near vision only, because as you have seen, distant vision is perfect under the effect of the natural state of the refraction.

The myope also uses his accommodation in near vision only, because his distant vision cannot be improved by any effort of accommodation.

In the emmetropic and myopic eyes, therefore, the ciliary muscles are constantly changing between contraction and relaxation, and can perform with ease and regularity the work imposed upon them by the acts of vision.

But we find different conditions in a large number of hypermetropic and astigmatic eyes. I have shown you that the hypermetropic eye needs the assistance of a convex lens to focalize parallel rays of light on the retina. Now whether a convex lens be placed *before* the hypermetropic eye or whether the same refractive value of such lens be added to the crystalline lens *in* the eye by an effort of accommodation—the optical effect would be the same; in either case the defect of refraction would be removed; the eye would be put in the condition of an emmetropic eye and have clear distant vision. Many hypermetropes enjoy this perfect vision, because they succeed very well in correcting their refractive error by the efforts of accommodation. And in astigmatic eyes it is also possible within certain limits, to overcome the abnormal refraction by special efforts on the part of the ciliary muscle.

Every hypermetrope and every astigmatic person who can see with his unaided eye as clearly as an emmetrope, enjoys this good vision at the expense of the ciliary muscles; they are working at a high tension all day long. But this incessant tension of the ciliary muscles can be maintained only by the expenditure of a large amount of nerve energy; and if the nerve force is consumed quicker than it can be replenished, this abnormal wear and tear will eventually cause an exhausted and irritable state of the nervous system, which manifests itself in various ways in different persons. The most prominent among the nervous symptoms induced by the strained efforts of accommodation, are severe pain in the forehead, or occiput, typical attacks of migraine, vertigo, nausea, vomiting, a sense of weariness coming over the person after a shorter or longer use of the eyes.

In many instances patients connect their nervous trouble with the eyes, because it always begins with a dull pain or a strained feeling over the eyes; or because they cannot read or write without getting a violent headache; but in a number of cases the patient does not connect his headache with his eyes because he can see apparently as well as any body, and claims he can read without feeling any discomfort in his eyes. Such patients think their eyes are perfect, and probably they are inclined to laugh at your suggestions to have their eyes examined, because you suspect the eyes to be the cause of the frequent headaches you have tried in vain to relieve by medical treatment. Among the last hundred refraction cases examined in my office, 46 patients mentioned headache as their chief complaint, and as the main reason for having their eyes examined. Five of those 46 patients had hypermetropia, 7 myopic astigm., and 34 hypermetropic astigmatism. That the hypermetropic astigmatism is so predominant among those cases will not surprise you if you remember that this is just the refractive error which embarrasses the vision the most, and causes the eyes to make the greatest effort for its correction.

And here I wish to emphasize the fact that in many cases the refractive errors are of comparatively small degrees, often detected only after a searching examination. Let me give you a few illustrations: Here is a boy 12 years old, sent to me two months ago because he had more or less headache every day since last fall. He had complained in the same way during the previous winter and spring; but had been entirely free from headache during the vacation. He is a bright healthy boy, and the family physician searched in vain for some palpable cause for those persistent dull headaches. And if the boy was not himself only too eager to go to school, he might, and probably would have been suspected as shamming sickness in order to be excused from school. His vision was apparently perfect ($\frac{20}{20}$), with normal refraction; but after the ciliary muscle had been thoroughly paralyzed, the right eye showed hypermetropic as. of $\frac{1}{2}$ D. and the left eye, hypermetropic astigmatism of only $\frac{1}{4}$ D. The proper glasses for the correction of these small degrees of astigmatism were given for schoolwork, and they have relieved the boy from his school-headache. He has not had any sign of a headache, and has not lost one hour of school since he got his spectacles.

Here is another striking example: In January a gentleman, 36 years of age, a book-keeper, healthy, temperate and very regular in all his habits, called to have his eyes examined. As a boy, he was often taken out of school on account of his eyes; and the past 18 years (*i.e.*, since he began book-keeping) he had been troubled by occasional attacks of headache (starting over the eyes and going all around the head) and vertigo. These attacks gradually became more frequent, and lately he was often obliged to quit work at noon on account of severe headache and dizziness. The examination revealed $\frac{1}{4}$D. of hypermetropic astigmatism in each eye. He got the correcting glasses, and he reports now he has been attending to his office work every day from morning till night, and has not felt the faintest indication of headache or vertigo.

When for the first time you were told that headaches, nervous dyspepsia, etc., could be cured by a pair of spectacles, you probably had your serious doubts of the veracity of the person who told you this story; for you could not very well conceive how a pair of glasses should in any way influence the nervous system. And you were right; the glasses have no direct influence on the nervous system. The glasses only correct the error of refaction, that is to say, they put the eye in the condition of the emmetropic eye, and thereby relieve the ciliary muscle of the necessity of excessive work. Take for instance hypermetropia of 2 dioptries: to see well this eye has to increase the refractive power of its crystalline lens by 2 dioptries through the action of the ciliary muscle; and *this perpetual tension of the ciliary muscle is the connecting link by which the hypermetropia reaches the nervous system.* Now if we place the 2 dioptries of needed increase of refraction before the eye in the shape of convex glasses, the deficiency in refractive power is mended by them as well as the tension of the ciliary muscle did it before; and the hypermetropia corrected and its disturbing effect upon vision removed, there is no more need for the continuous efforts of accommodation. You now un-

derstand the modus operandi; the glasses relieve the muscular tension and, this muscle strain being the source of the nervous disturbances, the glasses in eliminating the disturbing cause indirectly relieve the nervous system.

Whether an error of refraction will cause any nervous disturbance, and how violent symptoms it will produce, does not depend on the degree of refractive anomaly, but on the condition of the nervous system. It is a great mistake to think severe nervous symptoms cannot be produced by small refractive errors, because their correction by accommodative efforts requires only a proportionately slight strain of the ciliary muscles — on the contrary, as I have said before, in the majority of these cases we find comparatively small degrees of refractive errors, especially often slight degrees of hyperopic astigmatism. For these slight anomalies can be corrected by an amount of muscular tension which the ciliary muscles can easily afford to continue without getting quickly exhausted, and under these circumstances the eye will make this special effort to correct the abnormal refraction in the interest of clear vision. But if the refraction departs much from emmetropia; if, for instance, the degree of hypermetropia is so great that its correction would require nearly all the available power of accommodation, you understand that the ciliary muscles could not meet this demand but for a few minutes; it would quickly be exhausted; its tension would be relaxed, and the sight grow dim in proportion to the degree of the existing ametropia. The correction of these higher degrees of refractive errors being impossible by a reasonable and continued effort of accommodation, the eye gives up the attempt; and therefore these patients do not enjoy very clear distant vision, but on the other hand do not suffer from the secondary effects of the eye strain. This is one reason why not every hypermetrope or astigmatic person exhibits symptoms of nervous disturbance. But you may also meet two persons showing the same degree of astigmatism; but while the one is suffering severely from the effects of the ciliary muscle strain upon the nervous system, the other is perfectly unconscious of straining his ciliary muscles. This fact does not argue against the existence of the relationship between eye-strain and nervous disturbances; but it only shows that one person can endure an amount of wear and tear of the nerve forces, which the other person cannot. The nervous organization of no two persons is alike; the reserve force is not dealt out to all with the same measure; one person has very little of it; another person is endowed very liberally with it; and it is this difference in the reserve nervous force which explains that the same cause which in one person will raise a tremendous nerve storm, will produce but the faintest ripple of disturbance in the nervous system of another person.

AUDIBLE NERVE CURRENES. — Dr. Wedensky, of St. Petersburg, at the recent physiological congress held in Liège, contributed a series of telephonic demonstrations of the currents of action in nerves.

THE Alabama State medical examining board rejects forty-one and sixteen one-hundredths per cent. of candidates who apply for a license.

SOCIETY PROCEEDINGS.

American Electro-Therapeutic Association.

Second Annual Meeting, held in New York, October 4, 5 and 6, 1892.

WILLIAM J. MORTON, M.D., PRESIDENT.

FIRST DAY, OCTOBER 4—MORNING SESSION.

The Association was called to order in the New York Academy of Medicine, by the President, at 10:30 A.M. The first order of business was the election of new members.

LIST OF NEW MEMBERS.

Dr. Floyd B. Crego, Detroit, Mich.
Dr. H. H. Hahn, Youngstown, O.
Dr. A. G. Henry, Courtland, N. Y.
Dr. Thos. W. Poole Lindsay, Ontario, Can.
Dr. W. J. Herdman, Ann Arbor, Mich.
Dr. D. S. Campbell, 9 Washington Ave., Detroit, Mich.
Dr. Emil Heuel, 352 Willis Ave, New York, N. Y.
Dr. Wm. Davis, Omaha, Neb.
Dr. J. T. Harvey, Boston, Mass.
Dr. C. W. Martin, Topeka, Kan.
Dr. E. B. Sangree, 744 S. Fifteenth St., Philadelphia, Pa.
Dr. G. M. Hammond, 58 W. Forty-fifth St., New York, N. Y.
Dr. Robert L. Watkins, 320 W. 145th St., New York, N. Y.
Dr. Lucy M. Hall Brown, 134 Montague St., Brooklyn, N. Y.
Dr. Chas. R. Dickson, 263 Victoria St., Toronto, Ontario, Can.
Dr. Howard Smith, Surgeon U. S. N. (Retired).
Dr. F. Schavoir, S. Atlantic St., Stanford, Conn.
Dr. Ernest Wende, 174 Franklin St., Buffalo, N. Y.
Dr. O. S. Phelps, 143 W. 131st St., New York, N. Y.
Dr. S. T. Anderson, Bloomington, Ill.
Dr. Spencer M. Free, Dubois, Pa.
Dr. F. Semeleder, Caille Sur 1, No. 1018, Mexico, Mex.
Dr. J. Mount Bleyer, 118 E. Sixteenth St., New York, N. Y.
Dr. Willis E. Ford, 266 Geneva St. Utica, N. Y.
Dr. G. E. Percy, 9 Benevolent St., Providence, R. I.
Dr. D. J. Neylan, 172 Hope St., Bristol, R. I.
Dr. F. H. Wallace, Boston, Mass.
Dr. W. T. Bishop, Harrisburg, Pa.
Dr. Halford Walker, 56 Isabella St., Toronto, Ontario, Can.
Honorary Fellow—Dr. Bruce Clark, M.A., M.B., F.R.C.S., 46 Harley St., Cavendish Square West, London, Eng.

President William James Morton, M.D., read his address on

ELECTRICITY AND MEDICAL ART AND SCIENCE.

Fellow Members of the American Electro-Therapeutic Association:—It falls to my fortunate lot to have the honor and the privilege of declaring this, the second annual meeting of the American Electro-Therapeutic Association, formally open.

In accordance with precedent, a few words are, I believe, expected from your presiding officer at this stage of our proceedings.

I might content myself with selecting some special subject, but it seems to me that our programme is already richly laden with these; moreover I divine that there are thoughts of a more general scope in the minds of all of us present who have watched the steady growth of this young organization and who have at heart its welfare. It is to some of these thoughts that I will attempt to give expression—how inadequately, no one is more conscious of than myself—under the general heading of Electricity and Medical Art and Science.

From more than one point of view this assemblage of medical practitioners especially interested in the applica-

tion of electricity in medicine is an unusual event. Electro-therapy has too long, hung, so to speak, on the outskirts of medicine. Never has a nobler agency for cure been more ignobly treated. Seldom has a branch of science which requires man's highest intelligence to comprehend been so sedulously relegated by professional neglect to the hands of those least gifted by mental qualifications or by integrity of character to pursue it. I do not speak too strongly when I say that with exceptions only the more brilliant for their isolation, electro-therapy has been too long left to the designing, the ignorant and the incompetent. The reasons for this state of affairs are manifest; they are inherent to the nature of the subject and to the nature of the medical profession. Among some of the more obvious of these reasons are:

1. The difficulty of comprehending the agency itself.

2. Our inadequate knowledge of the nature of disease.

3. A traditional adherence to medicines and drugs as remedies, to the exclusion of natural agencies.

4. A skepticism as to the value of all strictly therapeutic measures—a consequent neglect of such measures and an accompanying perversion of the function of the physician from the art of healing to that of scientific explorer.

5. The natural contempt felt for the ignorant methods of the class of men (generally not physicians) who extensively treated disease by electricity.

6. The stupidity and ignorance of the public who buy electric nostrums, think that electricity is the vital principle itself, and regard it as the great "cure-all."

7. The unfortunate appellation, for a physician, of the term "electrician" with the idea that he is a mere administrator and consequently a subordinate. It is safe to say, to-day, that those who use electricity as a means of cure would repel the title as having no special application to themselves. They use not alone electricity but also all measures that seem applicable; they are in short physicians.

These reasons for the present position of electricity are too obvious to require discussion. Such of them as relate to the nature of the agent and to the nature of disease only incite us to profounder study, while such as refer to the relations of electricity to the medical profession will disappear with the higher education of the profession and with a corresponding purging of electro-therapy from mystery and humbuggery by those whose labors are undertaken in a purely scientific spirit.

And now a word as to where we stand to-day—a glance as it were, and that a brief one, at the evolution, so to speak, of electro-therapy.

The single observation of the workman who noticed twenty years ago that the dynamo machine was reversible into the motor has wrought a wondrous change in the relations of electricity to the affairs of mankind—a change which naturally worked itself out in commercial and industrial directions where self-interest and gain were at stake and where capital was available. As a result there has sprung up a new class of experts—the electrical engineers—self-taught and acquiring their science as the need arose in the first instance, and now scholastically trained.

Always in advance of them the new science sprang into being; its demands strained their highest intelligence and highest energies. Electricity had emerged from its thralldom; had cast aside the pedagogic flummery of the class-room and the text-book, and had become a part of warring, hard and practical life. A giant had arisen from his cradle; his followers thronged after him and multiplied.

Electricity had revolutionized physics when it made the conception of the identity of light and itself the only tenable one, had revolutionized chemistry when Faraday established his "voltametric law" and law of electro-chemical equivalence. To-day it has revolutionized the arts, communication and transportation, and the period has just arrived when its influence is beginning to be felt in medicine.

Partially satiated with his conquests over inanimate wires and iron, the electrical engineer is already turning his attention to the action of electricity upon living things—is invading the realm of biology and medicine, and is just to that degree a help to the medical man.

On the other hand the medical man is turning to the physics of electricity and acquiring the lore of the electrical engineer—a happy direction for both and a happy combination for the welfare of electro-therapy. Medicine welcomes the electrical expert; we welcome his presence among us to-day.

It is this great stride of electricity into the other affairs of life that has again forced it into prominence in medicine. When first it invaded medicine it was under false colors of identity with the "vital principle" and "nervous force;" its empirical results were registered from a false point of view. To-day an exact science knocks at the doors of medicine—an inexact science—and demands a hearing. On the one hand is living protoplasm, differing only from dead protoplasm in that it exercises chemical affinities by the inexplicable law of "life;" on the other, a rate of motion capable of affecting gross substance, living as well as dead, and of exhibiting in it the phenomena we term electric. Can we hesitate to believe that it is a great study and worthy of our best thought to ascertain what is the effect of this manifestation of energy called electric and electricity upon living human tissue, in health and in disease? It is this pursuit which has brought us together to-day, and under advantages which our predecessors, even in recent years, were infinitely far from possessing.

Not far distant we may catch the gleam of a new electro-therapeutics arising in the wake of the new electrical science. It requires but little prophetic spirit to watch its growth, founded upon the exact physics of electricity, upon biological study, upon an ever increasingly exact pathology and upon rigid clinical observation.

Electricity is a science, born new every day, and its votaries daily form a new school. The observation of yesterday put in practice today, shelves a hundred well used tomes and saves as many and more lives.

In the onward march of measures for the relief and cure of crippled and wounded humanity I see electro-therapeutics struggling with more and more powerful pace to the vanguard.

You ask—the skeptic asks for the basis of the faith that is in us. It consists broadly: 1, in the known, exact, and remarkable power of the agency itself. Electricity, as exhibited in the familiar physical phenomena of heating, lighting, chemical and mechanical effects, and 2, in its known, exact and remarkable actions upon living tissue.

There are positive pillars of fact upon which we build our faith; among these are,

1. *Excitation of living protoplasm*: Electricity causes protoplasm, animal and vegetable, to contract or otherwise exhibit its characteristic functional excitability. Both nerve and muscle tissue respond to the electric stimulus, dependently and independently. The parts of the human body beneath the skin can be excited in no other manner in a corresponding degree.

(*To be continued.*)

DOCTOR OF MEDICAL SCIENCES is a new medical degree proposed for establishment in France by the French Minister of Public Instruction. This title will be superior to the ordinary M.D.

THE
Journal of the American Medical Association
PUBLISHED WEEKLY.

SUBSCRIPTION PRICE, INCLUDING POSTAGE:
PER ANNUM, IN ADVANCE $5.00
SINGLE COPIES. . . . . 10 CENTS.

Subscriptions may begin at any time and be sent to
THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION,
No. 68 WABASH AVE., CHICAGO, ILLINOIS.

All members of the Association should send their Annual Dues to the Treasurer, RICHARD J. DUNGLISON, M.D., Lock Box 1274, Philadelphia, Pa.

MEMBERSHIP IN THE AMERICAN MEDICAL ASSOCIATION.

This is obtainable, at any time, by a member of any State or local Medical Society which is entitled to send delegates to the Association. All that is necessary is for the applicant to write to the Treasurer of the Association, Dr. Richard J. Dunglison, Lock Box 1274, Philadelphia, Pa., sending him a certificate or statement that he is in good standing in his own Society, signed by the President and Secretary of said Society, with five dollars for annual dues and subscription for THE JOURNAL. Attendance as a delegate at an annual meeting of the Association is not necessary to obtain membership. On receipt of the above amount the weekly JOURNAL of the Association will be forwarded regularly.

SATURDAY, JANUARY 14, 1893.

THE PARASITE OF CARCINOMA.

During the last few years a whole literature has come into existence on the alleged parasite of carcinoma. In every laboratory this obscure branch of pathological histology has been studied with zeal and persistence. COHNHEIM's theory that tumors are due to exaggerated growth of primary remnants of the embryonal folds, gone astray in various parts of the body, has been severely criticised by the enthusiastic believers in the parasitic origin of carcinoma; it has been characterized as purely speculative, as founded only upon probability. It has been shown that embryonal folds exist in all multi-cellular organisms and that consequently invertebrates, theoretically considered, would be just as much liable to various forms of tumors as the higher animals, but such a thing as a carcinoma has never been described in the inferior animals up to the present time although they are very liable to parasitic tumors of various kinds. COHNHEIM stated that carcinoma is not contagious and this statement still holds good; but the opponents of the embryonal misplacement theory are not slow to point out that many diseases, proven absolutely to be of infectious and parasitic origin, are not in any sense contagious. The question continually forced to the front by the bio-pathologists consequently reads: Is it not possible that in man and the higher animals malignant neoplasms are of parasitic origin just as in the lower animal scale where all tumors are parasitic? Many authoritative scientists believe that this question has already been answered in the affirmative by the actual demonstration of cancer organisms. Others again, equally prominent, believe that Cohnheim's theory is for the present the only acceptable, and probably also the only true, theory. Then again, many pathologists have placed themselves in an attitude of critical expectancy, ready to give every result of continued investigation fair and unprejudiced consideration refusing, however, at the present to take any positive stand on the question. The solution of this problem appears to hinge largely upon the interpretation of the various bodies found by means of recently improved technique in the interior of carcinomatous cells. These bodies have been variously interpreted: Some regarding them to be, wholly or partly, as VIRCHOW did in 1851, the products of endogenous cell division, others as dead red corpuscles, or as dead leucocytes, or as due to the invagination of one cell into another, or to degenerative changes of various kinds in the protoplasm and nuclei of the carcinoma cells. NOEGGERATH states that he has been able to show that all the mysterious bodies found in carcinomas could be traced to pathological alterations in the nuclei. Recent technical modifications resulted in such marked differentiation of the cell and its nucleus from the inclusion so-called that, according to many investigators, doubt could no longer be entertained as to the fact that the included mass has the structure of a true cell presenting no appearance suggestive of degeneration either of the protoplasm or of the nucleus of the epithelial cell proper. Thus PUFFER and WALKER following in the foot-steps of SJÖBRING, FOÁ, SOUDAKEWITCH and others employed the BIONDI-EHRLICH triple stain and found the nucleus of the carcinoma cell to stain green, the protoplasm orange-red, while the nucleus of the parasite stained red and its protoplasm light blue, the resulting picture being so characteristic that the inclusions were unhesitatingly pronounced to be true parasites. METSCHNIKOFF in a recent and interesting argument entitled: "Remarks on Carcinomata and Coccidia" (*Revue Générale Sciénces Pures et Appliques*) states it as his opinion that these so called parasites have the greatest analogy with coccidia; he compares carcinoma with coccidiosis, as seen in the rabbit's liver, and finds many points of great and striking similarity between the two diseases. Coccidiosis is an infectious, parasitic disease, not contagious, the lesion consisting of nodules of varying size, composed of proliferating biliary ducts whose epithelial cells contain the coccidia, voluminous sporozoic organisms concerning whose role in this disease there is now no longer any doubt. Like coccidiosis carcinoma is characterized by epithelial cell proliferation; like coccidiosis carcinoma is not contagious; and finally, METSCHNIKOFF concludes as already stated that some of the peculiar bodies demonstrated in carcinoma cells by recent investigation present the closest resemblance to coccidia and this conclusion he regards as sufficiently reliable to serve as the starting point for new researches. VITALIS MUELLER (*Virchow's Archiv.*), on the other hand, suggests that these coccidioid parasites are but the products of indirect nuclear fragmentation in dropsical carcinoma-

tous cells; he was not able to find any karyomitotic figures in the nucleus of the alleged parasite but he did find the nuclei in the epithelial cells containing this parasite undergoing indirect fragmentation. Unanimity of interpretation of these interesting appearances is consequently not yet achieved, but it can, without much fear of contradiction, be stated that the concensus of opinion of a very large number of scientists is to regard the recent bodies referred to as parasitic in nature. The beginning already made in the microbic study of carcinoma is certainly encouraging, but it is quite evident that part of the investigation must be conducted along new lines in order to completely solve this deeply obscure but important problem regarding the etiology of carcinoma.

THE COMING MEETING AND ITS WORK.

The superior character of the papers which have appeared in THE JOURNAL has been very gratifying to both the managers and members of the Association. It furnishes the strongest possible proof of our oft repeated statements, that to raise the character and tone of THE JOURNAL, the members must prepare and read better papers. The officers of each Section must exercise care and discrimination in the selection of such papers. The old method of gathering every paper offered, read personally or by title, and sending them indiscriminately to the editor for publication, making THE JOURNAL a practical dumping ground, is perilous to any publication, no matter who manages it. Happily this is rapidly passing away, and although many papers are yet received by the editor, from the Section officers, that are not creditable to the authors or the Association, the number is growing less every year. This is true in the British Medical Association journal. Recently some severe complaints have been made and questions asked why carelessly written, elementary papers of no value to science should fill up the paper? The editor calls on the Section secretaries to cull out and send abstracts of such papers if worth it, and announces his willingness to discriminate if sustained by vote of the Association.

Our Association is far more tractable and inclined to adapt itself to new conditions and demands than our foreign brothers. Hence both the Association and its Journal should be among the most advanced of scientific workers. This can only be accomplished by hard, exact work; members who expect to read papers at the coming meeting, should exercise the same painstaking care they would in the most delicate surgical operations. Every part of the paper should be most carefully considered and studied, and every theory and conclusion worked out as exactly as that of a brief to the consideration of a group of judges. Writers and readers of papers before the Associations often make the fatal mistake, that their experience and personal reputation will carry conviction above all faults of facts and methods of expression. To their admirers this may be true, but every year the circle of sharp critical readers is increasing; critics who are discerning and unsparing in their judgment, and who form clear conceptions on many topics that they are not personally familiar with. Foreign critics complain that American writers are careless in expression, and hasty in conclusions, and fall into the weakness of explaining minutely, what is not understood only in the most general way. This critical readers of THE JOURNAL see illustrated in many ways. The remedy for this is more time and study to the papers that are to be presented. Readers should remember that they are addressing a large unknown audience, of both this and the generations to come. If they have anything of value to say, it will be remembered, and be heard far down in the coming century. Medical science is awakening from its long sleep of theory and formalism. It has become aggressive, imperious and exacting, and demands the clearest, best sustained facts above all generalities. Any physician from college centers or lonely country practice, who has new observations and facts of science, is called to contribute them. As a duty they owe to others, such facts should be carefully studied and presented in the briefest possible way compatible with clearness. It should be assumed that the audience understands all the elementary principles bearing on such truths, and that the varied theories held by others pro and con relating to this topic are of little or no interest. The audience of the Association and its Journal have neither the time or space to follow exhaustively any subject of science. Its purpose is to keep its members in sympathy and touch with all advances of science, and stimulate pioneer work, pointing out new lines and avenues into the unknown. The few months to come is little enough time to prepare papers for the next meeting. If our friends and well wishers, and also captious critics, will spend their energies on papers which will be read, THE JOURNAL will be raised immeasurably and be less open to fault-finding.

A united effort along this line will soon place THE JOURNAL among the great periodicals of the world. This is not extravagance, for the material and the scientific men are here, to lead in the very front ranks of science. The first great want or need, is mobilization and concentration of study and effort, sifting out the facts and presenting them in the most available form, to stimulate and rouse others to correct or confirm them. This JOURNAL appeals to all its readers, and to every member who expects to present a paper at the coming meeting, to aid in securing a higher standard in the study and methods of presentation of the facts.

THE NEED OF NATIONAL QUARANTINE.—John S. Billings, surgeon U. S. A., writing from Washington, says:

"In reply I would say, in my opinion a system of national quarantine or maritime sanitary inspection can be organized and enforced in such a manner as to afford greater security to the country and cause less restrictions upon traffic and travel than result from the present State and municipal systems. Such a national system would cost more than the present systems, because it would have larger and better plants and better paid officials, but the cost, being defrayed from the national Treasury, would be much more fairly distributed."

Economy, in the face of cholera even now existent in Hamburg, may be said to occupy a "very secondary place" in the minds of the prudent citizen as well as of the experienced sanitarian.—*Baltimore Medical Journal.*

DOMESTIC CORRESPONDENCE.

Revision of the Code of Ethics.

To the Editor of the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION:

Dear Sir:—In THE JOURNAL of December 31 1892, "INQUIRER" asks if the writer has read the editorial of the *Medical News* of September 27, 1892.

1. The writer has read carefully the article in question, but its perusal has not convinced him that it would be wise to make any alteration in the Code; on the contrary this editorial would have had the effect of convincing him of the wisdom of leaving the Code intact had he entertained any doubts on that score, for the editor of a journal of the high standing of the *Medical News* is doubtless sure of his facts when he declares the general sense of the profession to be that the Code is an excellent guide for professional conduct, which is the same as saying that the majority of physicians are against any change.

2. The following is precisely the language of a part of the first paragraph of the editorial: "We think the general sense of the profession would answer that while the Code, as it now stands, is an excellent guide for professional conduct, it is wise to subject it to revision for two reasons: 1, it contains much that is unnecessary and useless; and 2, a respectable number of members of the profession demands its revision and is dissatisfied with certain of its provisions." If it is the general sense of the profession that the Code, as it stands, is an excellent guide for professional conduct, surely there is no need of change, for what excels cannot be bettered, and if the Code is excellent it cannot contain anything unnecessary or useless. The Code being an excellent guide for professional conduct, the demand for its alteration does not seem just, and dissatisfaction with any of its provisions is not consistent with the acknowledgment of its excellence. It would therefore be gracious for the minority to abide by the general sense of the profession and allow the Code to stand as it is, for it wrongs no man. The two reasons given in favor of revision do not appear to be valid, unless the language of the editorial has been wrongly interpreted.

3. In THE JOURNAL of December 24, 1892, is a letter by "IOWA," who thinks "it is safe to affirm that nine-tenths of the regular profession heartily agree with the views stated by 'CONSERVATIVE' in his letter to THE JOURNAL of the 10th inst., as to any change in the Code. . . ." The tenor of "IOWA'S" letter indicates that he is well informed on the subject he discusses, and he will doubtless gratify many readers by again giving his views, but more in detail, respecting the inadvisability of making changes in the Code.

4. "INQUIRER" seems to imply that the style of the Code bears some resemblance to the exuberant manner of some of the writers of the last two centuries, but this is scarcely just, for even the Johnsonian method is less objectionable than the loose style of Cervantes with its tiresome repetition of adjectives and its many other tautologies. Percival, who wrote after the admirable style of Addison, used less adjectives and adverbs, and the committee of 1847 improved upon the style of Percival. But is there any writing in which some literary blemishes may not be detected? Are not all mortals erring in many ways? If this were not the case there would be no necessity for laws of any kind. Whatever may be the blemishes of the Code, all its teachings are so salutary that not a word in any of its phrases should be expunged.

5. "INQUIRER" quotes from four of the writer's reasons for non-revision stated in THE JOURNAL of December 10, 1892, as though he thinks these reasons are stated too g nerally. Perhaps he is right. Perhaps the writer was wrong in taking it for granted that the readers of THE JOURNAL are all thoroughly well acquainted with the Code in all its details. In any event a brief sketch of the origin, lofty aims, extent and arrangement of the Code may not be out of season.

6. It is well known that the framers of the American Code modeled it upon the "MEDICAL ETHICS" prepared by Dr. Thomas Percival of Manchester, for the guidance of physicians and surgeons, and particularly for a son who was about to enter the profession but who died before the completion of the work. Certain parts of the American Code are especially designed for the information of beginners, while other parts are for the guidance of physicians throughout their professional career, and the remainder for patients and the general public. All these parts are essential to the consistency of the Code in its entirety, and not a part can be altered or expunged without seriously mutilating the document. The committee of 1847, of which Dr. Isaac Hays was chairman, appended a note to their report to the effect that "on examining a great number of codes of ethics adopted by different societies in the United States, it was found that they were all based upon that by Dr. Percival, and that the phrases of this writer were preserved to a considerable extent in all of them. Believing that language so often examined and adopted must possess the greatest of merits . . . . clearness and precision . . . . the committee . . . . have carefully preserved the words of Dr. Percival whenever they convey the precepts it is wished to inculcate." Dr. Percival dedicated his work, published in 1803, to Sir George Baker and to another son who was then a student of medicine, and said, in this dedication, that in the composition of the Code his thoughts had been directed to his deceased son "with the tenderest impulse of paternal love, and not a single moral rule was framed without a secret view to his designation, and an anxious wish that it might influence his future conduct." In this same dedication Dr. Percival says: "The relations in which a physician stands to his patients, to his brethren, and to the public, are complicated and multifarious, involving much knowledge of human nature and extensive moral duties. The study of professional ethics, therefore, cannot fail to invigorate and enlarge your understanding, while the observance of the duties which they enjoin will soften your manners, expand your affections, and form you to that propriety and dignity of conduct which are essential to the character of a gentleman."

7. It is not unlikely that they who now wish to expunge the first chapter of the American Code, will soon change their opinion after reading carefully the able commentaries of the late Dr. Austin Flint upon the Code. This precious little volume, bearing the title of "MEDICAL ETHICS AND

ETIQUETTE," published by the Appletons, of New York, should be diligently studied by every physician in the land, and should also be in the hands of the laity, for it concerns all men. In it every article of the Code is embodied and is eloquently commented upon, and the best reasons are given for its composition. Those who study these commentaries cannot fail to be impressed with the fact that there is no necessity to curtail the Code, that every word it contains is in its proper place, that the language is not redundant, and that the moral principles it inculcates are of the most exalted character.

8. The absence from the Code of high sounding words, of attempts at embellishment, or of what is often called fine writing, is remarkable. The document is characterized by the skilful and judicious use of such parts of speech as exactly convey the desired ideas, by the most precise phraseology, by great lucidity of statement, by the soundest moral principles, and by an excellent arrangement into chapters, articles, sections and subsections. It contains 5,240 words or thereabouts, and can be read in an hour and a half. Percival's code contains about 20,000 words and has not generally been considered too long.

9. The American Code, as shown above, is a short abstract of Percival's code, but the editorial of the *Medical News* of September 17 offers a proportionately shorter abstract of this abstract, but the seventeen sections, containing in all about 889 words, suggested in this editorial, do not constitute a sufficient amplification of the golden maxim, be just —the fundamental principle of the ethics of all the relations of men with their fellows.

10. The writer of the editorial in question may, for a time, have lost sight of the fact that the Code is intended as well for the instruction of beginners in medicine as for the guidance of physicians of experience, for patients, and for the general public. His ground that the public "has nothing to do with acts on the part of physicians that render them amenable to penal law" is not tenable. Laws are framed by individuals, but are never operative until they have the sanction of the public or of those members of the public delegated to examine and enact them. The more the public knows of the Code of medical morals in its various relations, the better it will be for that public and for the profession.

11. The cry of want of conciseness in the Code is as unfounded as are all the other objections. Conciseness in the Code need not consist merely in economy of words, but in clearness and precision of statement, in absolute freedom from ambiguity, and in the fullest and most unmistakable directions without superfluous phrases. All these qualities exist in the Code as it now stands.

12. The *News* editorial says: "The Code need not, and should not, include exhortations and maxims that go without saying." If all men were just these exhortations would be unnecessary. Be just, should "go without saying," but it does not. Men are unjust often from mere thoughtlessness, and need reminding to be just and sometimes how to be just. Hence the Code, which is a commentary upon the maxims that "go without saying." No "clear-cut" set of dry short rules will answer. The perusal of the Code as it now stands gives pleasure as well as instruction, because the document is an attractive literary production of high order.

13. The American Code is an excellent amplification of the golden maxim, and is so well arranged as to be time-saving while it gives the fullest information to the different classes for which it was framed, and tells young physicians under what circumstances they may fail to be just to themselves and to others.

14. When the revision committee examine the Code critically in reference to its adaptation to the several classes of persons for which it is intended, they may not find in it superfluous articles or redundant language.

A CONSERVATIVE MEMBER.

The Regulation of Quacks by Local Legislation.

MANSFIELD, O.

To the Editor of the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION:

Sir:—Since the announcement of the passage of the ordinance in this city entitled "The Registering of Physicians, Midwives and Pharmacists," I have been flooded with letters from all parts of the country asking for a copy of the ordinance which I have been unable to supply, and consequently take this method of reaching the profession at the earliest possible moment with a copy of the ordinance, which is as follows:

Registering of Physicians, Midwives and Pharmacists, in the City of Mansfield, O.—It shall be the duty of every physician, midwife and pharmacist practicing in the City of Mansfield, Ohio, to register in a suitable book prepared therefor by the Health Officer; which register shall contain the name, the street address, the college at which said physician, midwife and pharmacist graduated, and date of said graduation; and further, that on and after the adoption of this ordinance, no person shall be permitted to practice the art of medicine, surgery, midwifery, pharmacy or dentistry, or sell medicine or drugs from house to house, or on the streets, without registering with the Health Officer, and furnishing him, when so required, a sample bottle of the medicine to be sold for analysis; and displaying to him their certificate from the State Board of Pharmacy in the case of druggists, or their diploma of graduation from a recognized chartered medical or dental school in the case of a physician, surgeon, midwife or dentist.

And that such person shall not be eligible to receive a license from any city officer, until he has displayed the above mentioned documents or drugs, as the case may be, to the Health Officer, and received a certificate from him to the proper city officer, who shall then have the privilege of issuing the said person the necessary license, which shall not be for less than $10 or more than $50 a day.

And further, that any person violating this ordinance shall be subject to a fine of not less than $50 or more than $100 for each offense.

In the selling of drugs, this ordinance is not intended to apply to regularly recognized traveling salesmen who deal directly with the physicians or druggists of the city.

Attested: F. M. REAMY, City Clerk. JOHN V. VANNATA, Pres. City Council.

To the Editor of the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION:

I regret exceedingly that your printers changed two letters in the title to my little article in the last issue of THE JOURNAL, making "A Study of the Acquirements of the Average Prospective Medical Student," into "A Study of the Requirements, etc." You will readily see that this makes the title absurd. I am, very respectfully,

BAYARD HOLMES, Sec'y.

Chicago, January 7, 1893.

SELECTIONS.

HÆMOLYSIS—In the exhaustive and erudite study of the process of blood destruction or hæmolysis, which was chosen by Dr. Wm. Hunter for his recent lectures in connection with the Grocers' Company Research Scholarship, the proposition that the blood acts in its physiological and pathological relations similarly to other tissues is one which will at the present day be accepted without demur; but, although there is no doubt of the waste and renewal of all tissues and cells, the blood is singularly adapted for observing the method of such changes owing to the special colored element that it contains. It was then mainly an exposition of the destiny of hæmoglobin that the lecturer made, and

the facts and arguments which he adduced from observation of normal changes on the one hand, and of abnormal —whether induced experimentally or as the result of morbid action—on the other, were both numerous and sufficient. It would hardly be fair to Dr. Hunter to attempt a critical survey of the elaborate details of his work. He was dealing, as he said, with a comparatively novel subject, and no criticism could rightly be passed by any one who had not traversed the same ground. It may, however, be permitted to indicate a few of the salient points which are to be gathered from his exposition. In the first place, the derivation of bile-pigment from hæmoglobin is unquestioned, and it is to be noted that this conversion is not entirely limited to the liver cells, whither the products of effete red corpuscles are conveyed by leucocytes. For leucocytes and connective tissue cells can also produce pigments identical with bilirubin and biliverdin from hæmoglobin, although in the main the conversion is effected in the liver. The red corpuscles may, however, part with their hæmoglobin under the influence of changes created in the blood plasma, and the coloring matter thus set free may come to be deposited in the spleen, liver and bone marrow. That the portal area of the circulation is the region where this liberation of blood pigment (active hæmolysis) mainly takes place is a view which was, we believe, originally propounded by Dr. Hunter, who has still further elaborated it. He shows that this hæmolysis may occur in health, during digestion, in the spleen and gastro-intestinal capillaries; that it may be effected, in the same area, by the action of toluylendiamine; and that it probably occurs here in pernicious anæmia and malignant jaundice. The resulting free blood pigment is deposited to a large extent in the liver and to a lesser degree in the spleen, and even in the kidney—as evidenced by micro-chemical examination. The subject embraces, however, many other questions than these which we have indicated; and we only regret that Dr. Hunter had no opportunity to gather up the fruits of his labors in a few general propositions.—*The Lancet.*

Filtered or Boiled Water?—M. A. J. Martin, under this title, presents a very carefully studied paper. Recognizing the fact that many filters, so far from separating the bacteria, may even make the water richer in these organisms, this method cannot be recommended. Boiled water has lost its carbonic acid gas, and the salts of lime and magnesia are precipitated; the taste is flat, although on standing in a cool place it reabsorbs the greater portion of the lost gas. Even boiled water ought not to be long preserved. The problem apparently was solved in heating the water without loss of air, cooling it mechanically, and adding oxygen by means of an air-pump; or it can be boiled in closed bottles. Various ingenious apparatus have been devised for boiling water in closed vessels under pressure, and cooling it in the same apparatus. Investigations have shown that the slight differences observed in the chemical composition of the water before and after sterilization have not altered its potability. With a filter, one can drink only the water of which he knows the source; with boiling, one can use any water. Boiling, then, should be the procedure of choice as soon as any suspicion arises; it should be the rule, especially in large cities, during the progress of any epidemic.—*Gazette Hebdomadaire de Médecine et de Chirurgie*, 1892, No. 37, p, 433 (*American Journal of the Medical Sciences.*)

Condition of the Blood in Gastric Affections.—A considerable amount of uncertainty has hitherto existed in reference to the condition of the blood in connection with gastric affections, especially in ulcer and malignant disease of the stomach, and authors differ greatly in their statements on the subject. Orterspey (*Berlin Klin. Wochenschrift*) has made some careful experiments in order to clear up these doubts, and the following are the results he has obtained: In nine cases of ulcer of the stomach the results were very uniform—diminution in the amount of hæmoglobin and in the number of red blood corpuscles, these changes being particularly marked in those patients who had had hæmatemesis. These results of course correspond with the anæmic state so constantly met with in connection with this disease, and all previous investigators have found the same condition. Out of twelve cases of cancer of the stomach, in one the blood was perfectly normal, in eight the number of of red discs was diminished, in eleven there was a diminution in the amount of hæmoglobin present, in five there was an increase in the number of leucocytes, whilst in two, although the hæmoglobin was diminished, the red corpusoles were about normal in number. All these changes are neither characteristic of the cancerous cachexia generally nor of cancer of the stomach in particular, as they also occur to a similar degree in the course of many other affections. There is therefore no diagnostic difference in the blood to be noted in the two diseases, ulcer and carcinoma of the stomach. There is, perhaps, more value in the examination of the blood in doubtful cases, when there is uncertainty as to the case being one of malignant disease or chronic catarrh or a neurosis of the stomach, as the last two sometimes lead in extreme cases to the absence of hydrochloric acid in the gastric juice.—*The Lancet.*

BOOK REVIEWS.

International Clinics: a Quarterly of Clinical Lectures on Medicine, Neurology, Pediatrics, Surgery, Genito-Urinary Surgery, Gynecology, Ophthalmology, Laryngology, Otology, and Dermatology. By Professors and Lecturers in the Leading Medical Colleges of the United States, Great Britain, and Canada: Edited by John M. Keating, M.D., Colorado Springs, Col., Fellow of the College of Physicians, Philadelphia, etc., Judson Daland, M. D., Philadelphia, Instructor in Clinical Medicine, and Lecturer on Physical Diagnosis and Symptomatolgy in the University of Pennsylvania, etc., J. Mitchell Brun, M.D., F. R. C.P., London, England, Physician and Lecturer on Therapeutics at the Charing Cross Hospital, D. W. Finlay. M. D., F. R. C.P., Aberdeen, Scotland, Professor of Practice of Medicine in the University of Aberdeen, etc. Vol. I. Second Series. 1892. Philadelphia. J. B. Lippincott & Co.

This is a cloth bound book of 363 pages containing clinical lectures by 38 teachers and embracing 56 subjects. The number of authors to each country represented is as follows: United States 27, England 6, Canada 2, Scotland, Ireland and France, 1 each. The three leading cities of our own country furnish the following distribution of writers: Philadelphia, 8, New York 6, Chicago 2, nearly one-half of the whole number of contributors. The subject of general medicine occupies 192 pages, surgery, 60, neurolgy, 50, genito-urinary and venereal surgery 38, gynecology and obstetrics 37, pediatrics 20, ophthalmology and dermatology each 10, laryngology 9, otology 0. There are seven well executed plates and 33 figures or cuts. The table of contents could be improved by grouping the lectures under appropriate headings corresponding to the sections in which they are found. There is a very complete index.

The first 22 pages are filled by an exceedingly instructive lecture by Dr. J. M. Da Costa, on the pulmonary complications of influenza. The epidemics of this disease have been so flippantly treated by the people, the public press and even by the profession, in many instances, that it is a source of satisfaction to have the subject presented by an able

authority and with the dignity and thoroughness that its importance demands. The histories of six cases are detailed together with the results of quite extensive variations in treatment.

Dr. Arthur Wynne Foot, of Dublin, fills 18 pages with a lecture on Graves' disease. He endorses Sattler's theory that the starting point is in the medulla oblongata, near the origin of the vagus. Exactly one page, out of the 18, is devoted to the general subject of treatment. The practitioner who looks for any advancement, or even anything encouraging, in the management of this affection will be disappointed. It is to be hoped that such antiquated terms as Graves' and Basedow's disease, which have no medical significance in themselves, will soon give place to names of inherent scientific meaning, like ophthalmic goitre, that suggests two of the three prominent symptoms.

There is a short talk by Dr. P. Blaikie Smith, of the Aberdeen Royal Infirmary, on acute intestinal obstruction and peritonitis the result of enteric fever (?) In its ultra-conservatism it presents striking contrasts to the advanced teachings of the American leaders in abdominal surgery, of whom Dr. Senn is a strong type.

Dr. Wm. Henry Porter has entered on a series of lectures on syphilis, The first one is deeply interesting and full of promise.

The paper on ocular symptoms in Bright's disease by Dr. Thos. R. Pooley is one of the greatest practical value to every general practitioner.

Dr. Ohmann-Dumesnil, of St. Louis, contributes one of the most helpful articles in the series, on herpes zoster.

Six pages are devoted to general paresis, by Dr. B. Sachs, of New York. The differential diagnosis of this disease from paranoia and multiple cerebro-spinal syphilis is given. It is to be regretted that this entertaining writer stopped short of a consideration of the management of this disease.

Another excellent article that deserves mention is from the pen of Dr. R. Marcus Gunn, of London, on eye diseases in children. It is misplaced in the section on pediatrics, although there is no essential difference between ocular affections in children and the same disease in adults.

The book is the production of such a large number of authors, and comprises such a varied list of subjects that it is not practicable to give a comprehensive idea of its contents within the reasonable limits of a journal review.

It is sufficient to say that such names as Ashurst, Casselberry, Charcot, Goodell, Loffert, Mundé and Parkes are a guarantee of the worth of the work.

THE CHEMICAL BASIS OF THE ANIMAL BODY. AN APPENDIX TO FOSTER'S TEXT-BOOK OF PHYSIOLOGY. (Sixth Edition.) By A. SHERIDAN LEA, M.A., D. Sc., F. R. S., University Lecturer in Physiology in the University of Cambridge; Fellow of Carius College, Cambridge. New York: MacMillan & Co. 1893. (All rights reserved). Pages 288. Price $1.75.

This appendix, written upon the same lines as those found in the former editions of Foster's well known book of physiology, has been so enlarged that it now in reality constitutes a distinct treatise on the chemical substances occurring in the animal body; the volume is consequently paged separately from the rest of the text-book and it has an index of its own and it may be regarded as an independent work entirely. The chemical features of the more important of the various substances that occur in the body are briefly considered, such characters only being described as possess physiological interest. The chemistry of the several proteids is first taken up and then follows a section on the enzymes or soluble ferments, the more important of which, such as ptyalin, the amylolytic enzyme of the pancreas, pepsin, fibrin ferment, urea ferment and others are given a special description. The carbohydrates, fats, the various saline, crystalline and pigment substances found in the tissues, the excretions and secretions of the body are all described from the standpoint of physiological chemistry; as a rule brief but succinct statement is made regarding the practical uses made of many of these substance as, for instance, the preparation of hæmin crystals from minute quantities of hæmoglobin and methæmoglobin for medico-legal purposes. Extensive references are given throughout the book in the shape of foot-notes; the references to recent work appear exhaustive and complete; at the end of the volume is a list of authorities quoted which, arranged in double columns, occupies nearly eight pages. The publisher's work is well done; there are forty-one black and white figures illustrating the various crystals and the spectra of hæmoglobin and its derivatives or combinations. The statement can safely be made that this work on the chemistry of the animal body by Dr. Lea forms an in every way worthy appendix to Foster's standard book; at the same time it may be regarded as independent work of equal merit.

REPORT OF THE SURGEON-GENERAL OF THE ARMY TO THE SECRETARY OF WAR FOR THE FISCAL YEAR ENDING JUNE 30, 1892. Washington: Government Printing Office, 1892.

This report of 126 pages contains the usual amount of statistical material as well as the necessary financial statements. It is interesting to note that the library of the Surgeon-General's office now contains 166 006 publications of all kinds, of which 13 781 were added during the year. Of 77 candidates for medical officers invited to appear before various examining boards only 13 were found qualified to enter the service: there are now eleven vacancies in the medical department. The medical department of the National Guard has received considerable attention from the Surgeon-General's office with the wise view to secure its effective coöperation in time of war. At the end of the report are eleven excellent photographs illustrative of the field equipment now in vogue in the U. S. Army Medical Department.

MISCELLANY.

WANTED.—No. 2, Vol. XIX, of THE JOURNAL.

MASSACHUSETTS has a record as a sterile State. One-fifth of the married women are childless. In Suffolk county the percentage is one-fourth. So says the last census.

OFFICIAL LIST OF CHANGES in the Stations and Duties of Officers Serving in the Medical Department, U. S. Army, from December 31, 1892, to January 6, 1893.

First Lieut. Isaac P. Ware, Asst. Surgeon U. S. A., is assigned to duty at Ft. Sill, Oklahoma Ter., until further orders.

Capt. Adrian S. Polhemus, Asst. Surgeon U. S. A., leave of absence granted for two weeks, on surgeon's certificate of disability, is hereby extended fourteen days from December 30, 1892, on surgeon's certificate of disability.

First Lieut. Frank T. Meriwether, Asst. Surgeon, is relieved from further duty at Ft. Adams, R. I., and assigned to duty at Madison Bks., New York.

PROMOTIONS.

Lieut.-Col. Charles H. Alden, Deputy Surgeon-General U. S. A., to be Asst. Surgeon-General with the rank of Colonel, December 4, 1892, vice Heger, retired.

Major Albert Hartsuff, Surgeon, to be Deputy Surgeon-General with rank of Lieut.-Col., December 4, 1892, vice Alden, promoted.

Capt. Louis M. Maus, Asst. Surgeon, to be Surgeon with the rank of Major. December 4, 1892, vice Hartsuff, promoted.